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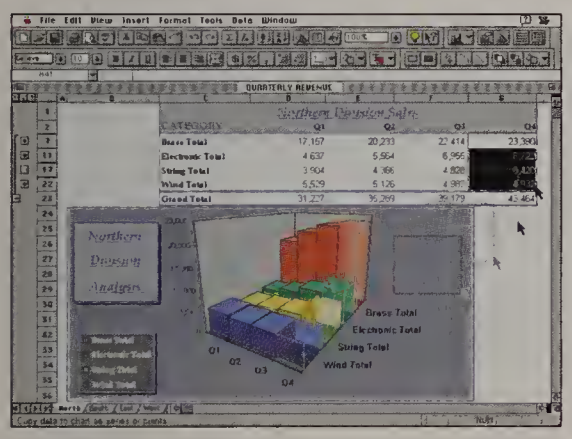

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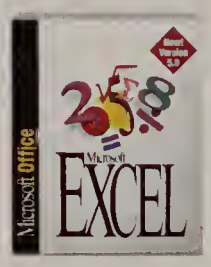

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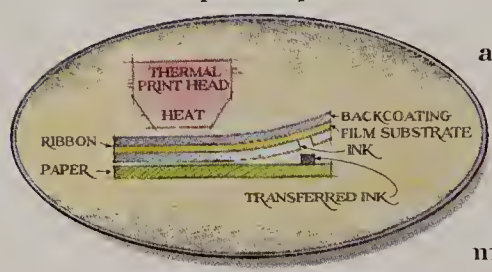

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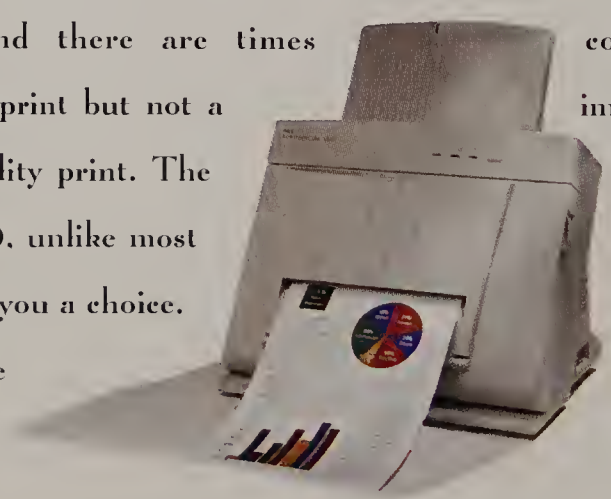

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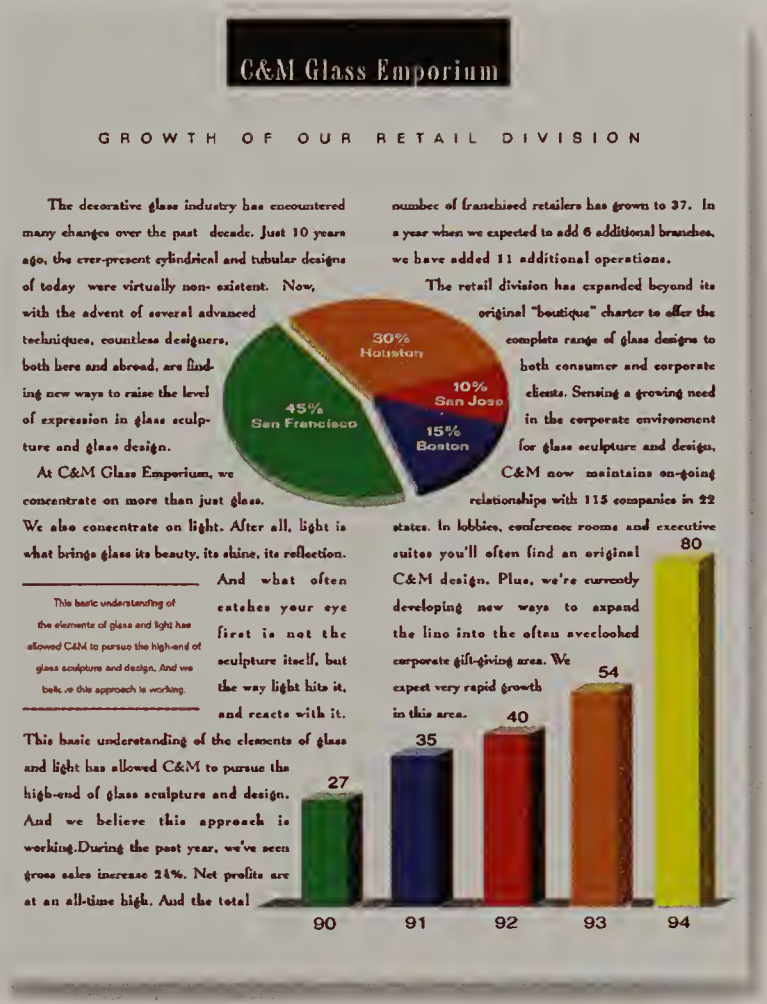

THERMAL TRANSFER MODE

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Contents

MACWORLD THE MACINTOSH® AUTHORITY MARCH 1995

Features

86 Power Mac Software Soars
BY JIM HEID When does it make sense to upgrade your software to PowerPC? Macworld Lab tests 28 applications to uncover the big performance winners.

96 Scanning Beyond 24 Bits
BY STEVE ROTH Can a few extra bits make a real difference in the image quality? Yes—Macworld shows how with six 30- and 36-bit flatbed scanners.

106 Word Processing Powerhouses
BY ROBERT C. ECKHARDT *Macworld* turns a critical eye on high-end word processors to help you pick the right tool for the job.

116 Lean Writers
BY DAVID POGUE We pick the best among four midrange word processors for those who prefer lean, mean—and inexpensive—writing machines.

122 Desktop CD-ROM Publishing
BY JIM FEELEY AND SUZANNE STEFANAC Does CD-R have a place on your desktop? Macworld Lab gives you the lowdown on publishing CDs without using a service bureau.

Desktop digital video under $100 in Reviews, page 73.

Publish your own CDs—Macworld Lab shows you how, page 122.

News

33 MacBulletin

34 News First Mac Clones • Faster Power Macs • Online piracy ring, and more

39 Power Mac News Dawning of a Power Mac replacement? • Newly native apps: Canvas 3.5, LabVIEW 3.1, and more

41 New Products

Opinion

19 State of the Mac
BY ADRIAN MELLO Intel's flawed logic.

25 Letters

155 The Desktop Critic
BY DAVID POGUE Macros for fun and profit.

157 The Iconoclast
BY STEVEN LEVY The bloat surrounding Word 6.

161 Conspicuous Consumer
BY DEBORAH BRANSCUM What "suggested retail" really means.

248 Wise Guy
BY GUY KAWASAKI Apple, will you ever learn?

Ergonomics Expertise: Using Your Mac More Safely

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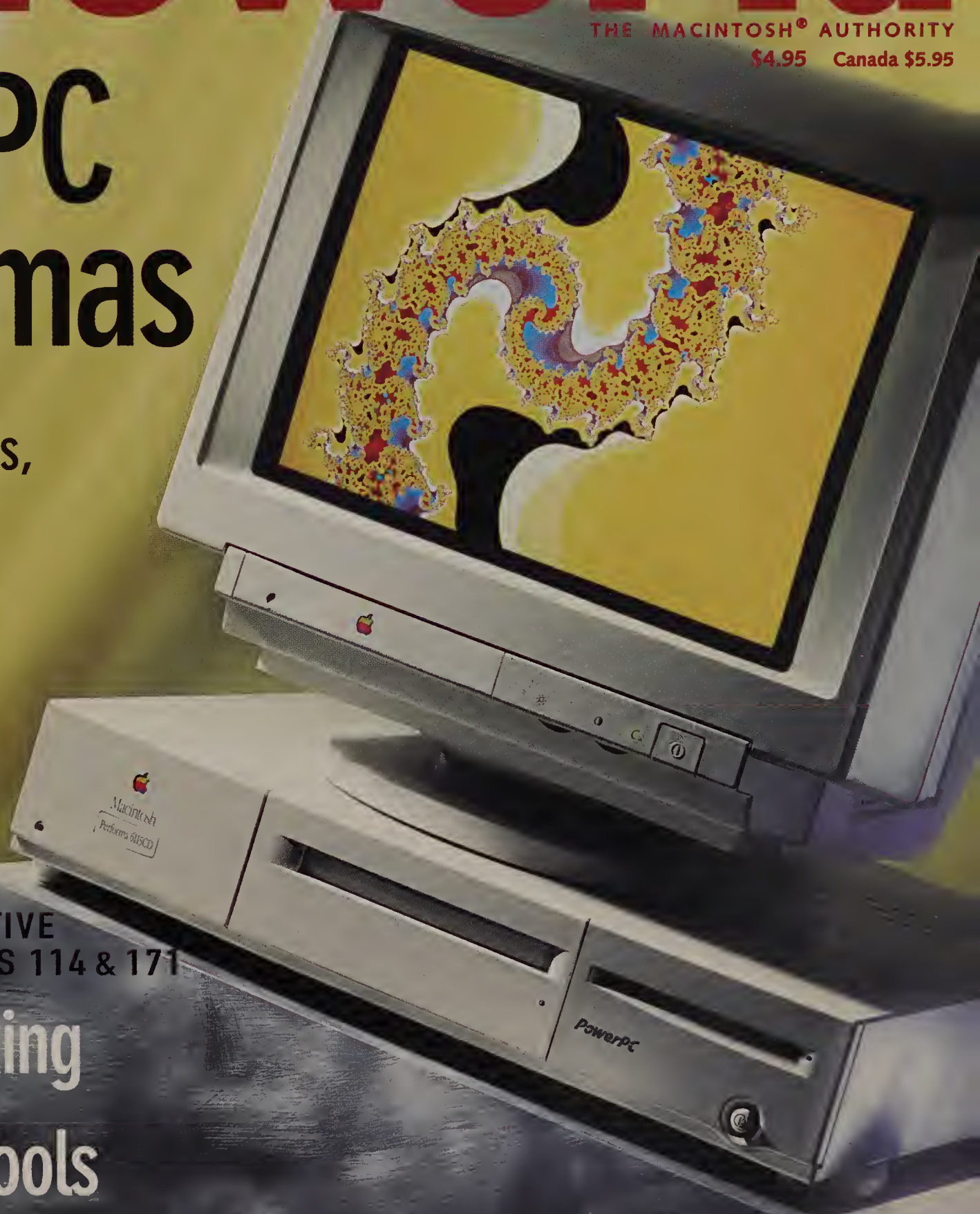
PowerPC Performas

5 Fast 6100CDs Loaded with Extras, Page 34



PLUS

Internet Info-Surfing

MOSAIC'S ADDICTIVE INTERFACE, PAGES 114 & 171

Foolproof Faxing

3-D Design Tools

EDITORS' CHOICE, PAGE 86

SAFER COMPUTING

EVERYWHERE YOU GO, IT SEEMS, PEOPLE ARE SEARCHING FOR WAYS TO REDUCE THEIR RISK OF injury from using a computer. Go into any computer store and you'll find a host of add-ons—from foam wrist pads to antiglare screens, from futuristic keyboards to trackballs—that promise to prevent injury. The truth is that using a computer can be risky—it's all too easy to unknowingly misuse your equipment and abuse your body. ◻ The injuries that can result, known as repetitive strain injuries, are serious medical problems for workers and their companies, and a significant share are related to computer use. For example, 1992 government figures (the latest data available) show that carpal tunnel syndrome—a painful condition sometimes associated with computer use—required a longer average recuperation period

HOW TO STAY HEALTHY

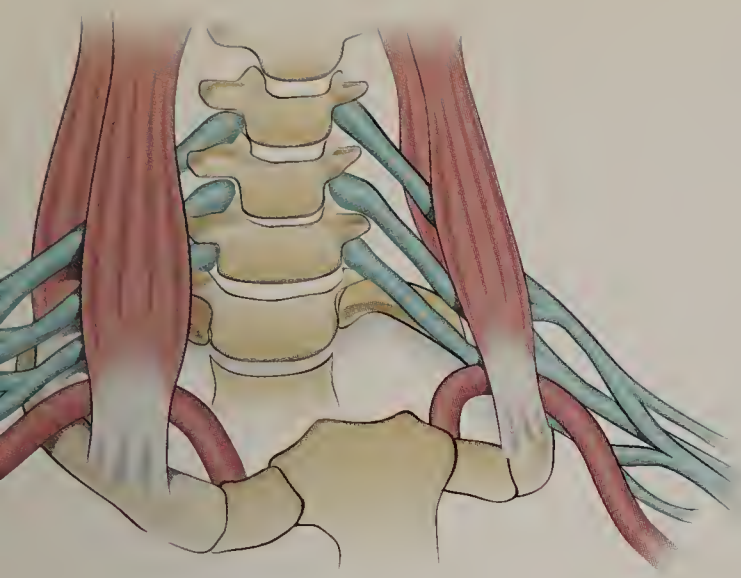
than any other type of work injury, including fractures and amputations. ◻ Just how widespread is the problem? According to the Bureau of Labor Statistics, in 1992, almost 11,000 cases of lost work time resulted from typing or key-entry jobs. And that doesn't count the other computer-related injuries, which the bureau doesn't track as such. It's also hard to tell how many of those cases were due to computer-related injury, partly because so many different ailments have been blamed on computers. ◻ If anything, computer-related illness is likely more common than official estimates, since many workers are reluctant to report problems to their supervisors. Also, government statistics don't include hobbyists and others who use computers at home or in small businesses. ◻ Part of the current epidemic of computer-related disorders may be related to heightened awareness among workers and health professionals. And there are steps that you can take to prevent such disorders, many at little or no cost. ◻ In this three-part article, I'll look at some of the health problems faced by computer users, with an emphasis on physical injuries. (For an update on the possible side effects of electromagnetic radiation, see *Conspicuous Consumer*, elsewhere in this issue.) First, I'll show you how you can prevent problems from developing to start with. Second, I'll help you learn how to tell if you might already be affected. Finally, I'll tell you where to turn for help. This advice is based on extensive research and interviews with leading medical experts. ◻ As you take action to reduce your risk, keep in mind that many companies offer solutions they claim to be ergonomic. Take all such claims with some skepticism: there are no accepted standards for ergonomic design. But no product—whether or not it has undergone rigorous testing by ergonomics experts—can address every person's needs.

by

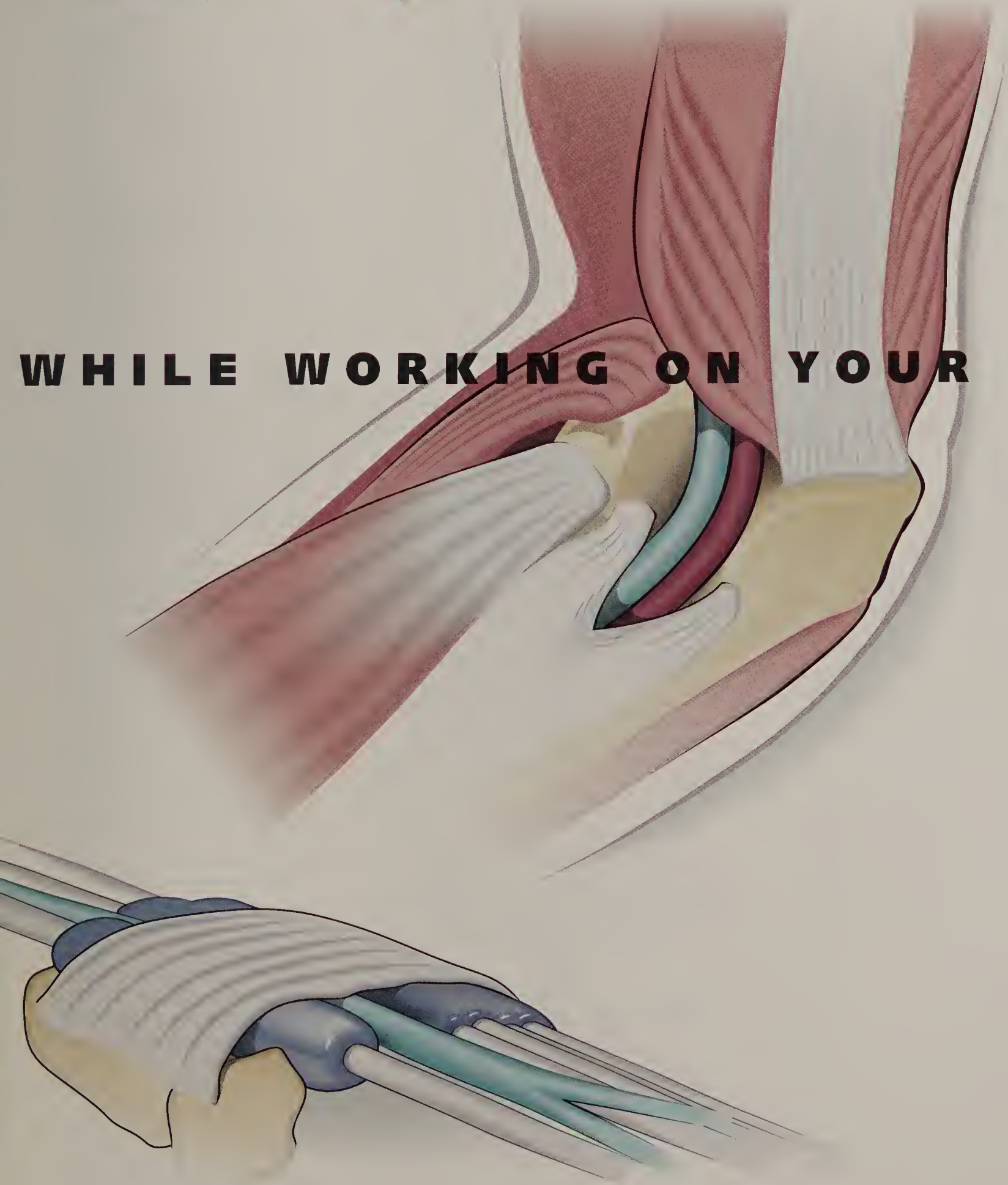
Franklin N. Tessler, M.D.

ILLUSTRATIONS BY ARNE HURTY

MEDICAL CONSULTANTS: ROBERT E. MARKISON, M.D.; EMIL PASCARELLI, M.D.; PAM SILVERMAN, O.T.R., C.H.T.; RICHARD UHL, M.D.; AND ELAINE VOLLOWITZ, P.T.



WHILE WORKING ON YOUR MAC



HOW TO **PREVENT** INJURIES

AS WITH OTHER TYPES OF illness, the most effective way to deal with computer-related disorders (CRDs) is to prevent them from happening at all. Even if you're not in pain, it pays to scrutinize your work area to make yourself more comfortable and less likely to suffer damage in the long term. Some changes, such as special chairs and keyboard trays, will cost you or your employer money. But there are many improvements that you can implement at little or no expense.

In the workplace, adoption of new standards by federal, state, and local government agencies over the next few years will force many businesses to focus on the design of their employees' computer workstations. But even without the threat of lawsuits or regulatory action, many companies are discovering that paying attention to office ergonomics makes good sense. That's especially true when you consider the potential gains in productivity and employee satisfaction, not to mention the savings in medical costs and salaries for temporary workers. When you add it all up, the payoff to business could total billions of dollars annually.

To help you evaluate your work space, I'll use a commonsense approach that divides your computer setup into three main areas: the seating arrangement (your chair and desk), the computer setup (your monitor, input devices, and other hardware), and finally, environmental conditions (such as lighting, noise, and air quality).

As you are considering your office layout, though, remember that making all the components work together—coupled with not overworking—is the key to preventing or lessening CRDs.

Where You Sit

There's not much you can do about your physique to make you less susceptible to CRDs, although keeping physically fit and performing simple exercises may help. For example, taking frequent breaks to get up and move your head, neck, shoulders, arms, and legs is one simple step you can take. The goal of such basic stretches is to move your body around to work the kinks out. (*Never* continue an activity that makes your pain worse, and check with your doctor if you're unsure about any exercise regimen.) But the design of your chair—and how well you use it—can have a significant effect on your comfort and health.

Chair To begin with, choose a chair that you can tailor to suit your body, instead of changing your posture to fit the chair. Seats with multiple adjustment points—usually available from office specialty stores—are best. (Because chairs fit each person differently, don't buy one without trying it out first. If you purchase from a catalog, make sure that there's a money-back guarantee.)

ASSURING THAT YOUR CHAIR FITS YOU WELL

A chair needs to fit your body size and shape, and adjust for different activities (such as typing, writing, and talking on the phone). Your chair should help you maintain your spine's natural curves. You also need to do your part: adjust your environment to fit you, change your working positions throughout the day, and vary the tasks you do so you're not in any one position too long.

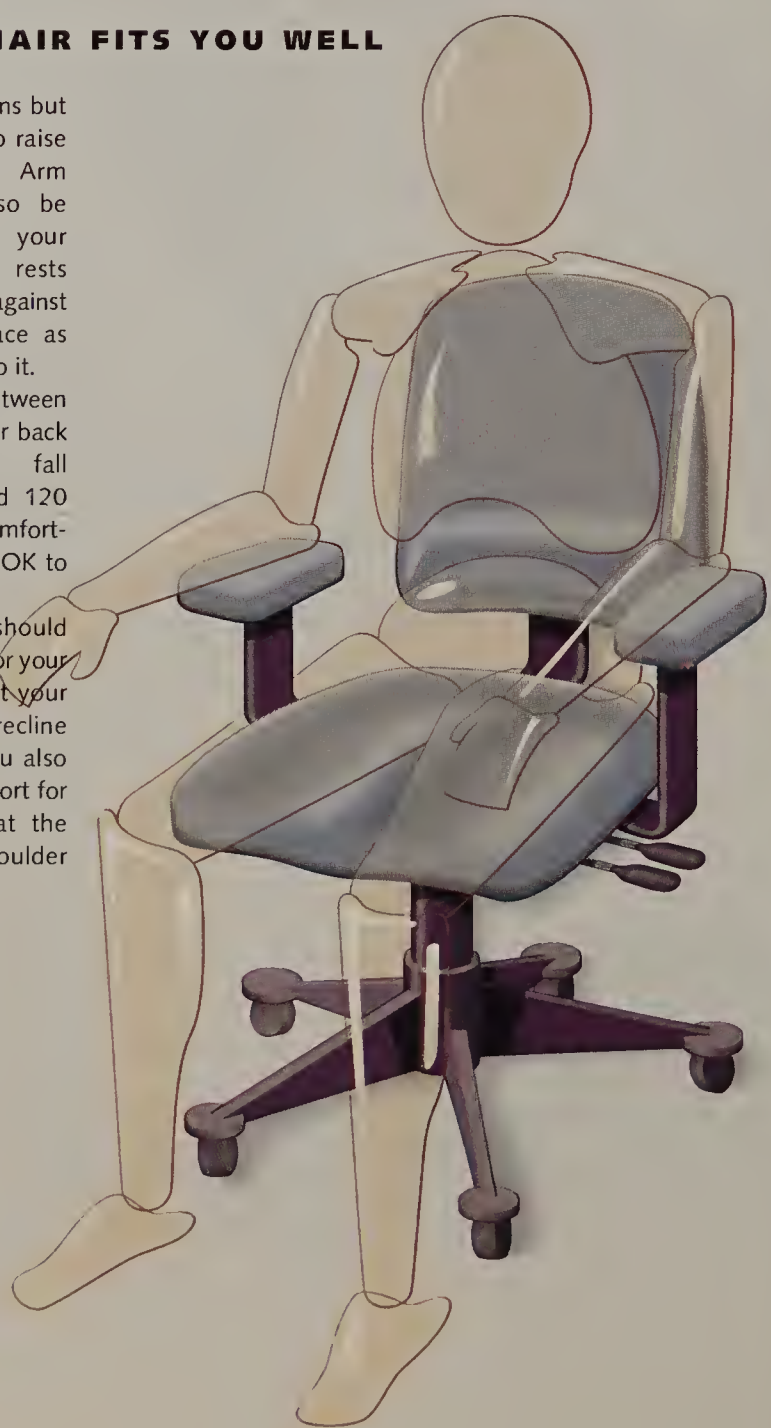
You should be able to sit back all the way against your chair back and be able to move your knees and lower legs freely.

The seat should be low enough for your feet to rest flat on the floor and high enough to support your thighs evenly.

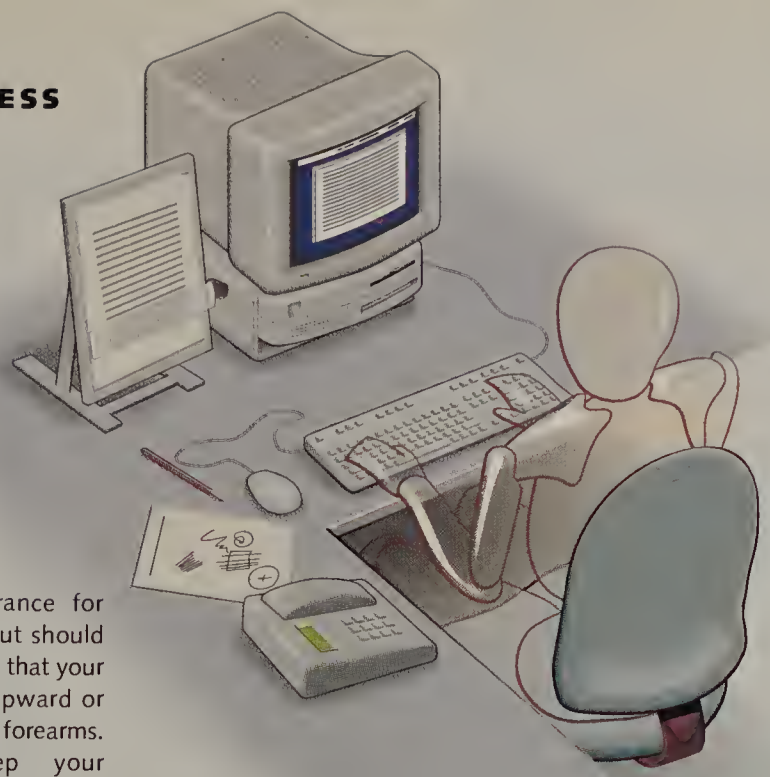
Arm rests should be high enough to support your forearms but not so high as to raise your shoulders. Arm rests should also be directly under your arms, and arm rests shouldn't bump against your work surface as you move close to it.

The angle between the seat and chair back should usually fall between 85 and 120 degrees—as is comfortable for you. It's OK to recline.

The chair should provide support for your lumbar region (at your waist). If you recline even slightly, you also should have support for your midback, at the base of your shoulder blades.



SETTING UP YOUR DESK TO MINIMIZE STRESS



As computers and peripherals get bigger, there's less room at most people's desks to work properly with their equipment. A larger space is what most people need, although most companies can't afford to provide it. But no matter what space you have, follow as many of these guidelines as possible to reduce stress.

The equipment you use most should be in front of you. Other frequently used equipment should be within

15 inches of the hands that use it.

Keep the pointing device in easy reach: close to the keyboard, at the same height. If you have a keyboard with a numeric keypad, try using your left hand for the input device.

Your desk or keyboard tray should leave enough clearance for your thighs but should not be so high that your wrists bend upward or you raise your forearms.

To keep your wrists straight, tilt the keyboard so the key tops form a plane in line with the slope of your forearms and wrists. Taller people may find a reverse (backward) tilt comfortable.

If you have to raise your hands and arms to type—and you can't adjust your seat, keyboard, or desk to compensate—try moving the keyboard away and resting your forearms on the desk (if you don't use the mouse a lot, try placing the keyboard in your lap).

The area of the display you look at most should be slightly below eye level. The monitor should be as far away as possible while still being readable; 16 inches should be the minimum distance.

If you use a copy stand frequently, place it at eye level, directly before you, with the monitor to the side. For occasional use, place the copy stand below the monitor or to the side of the monitor.

Work Surface Like office chairs, desks and other work surfaces are available in a bewildering assortment of configurations, ranging from basic, utilitarian models to complicated designs with adjustable shelves and cubbyholes. No matter what style you prefer, choose one that's appropriate for your body size, and make sure that there's ample work area for your monitor, keyboard, and other peripherals.

If you use a desk, there should be at least 2 inches of clearance between the tops of your thighs and the underside of the desktop or the keyboard tray. Pullout keyboard trays are helpful, particularly for desks that aren't adjustable, but they should have enough room for your keyboard and pointing device—you should not have to stretch to use your mouse or trackball.

It's also important to pay attention to items that aren't directly related to your computer. For example, placing your telephone opposite your writing hand makes it easier to hold the receiver and write at the same time. (Cradling the receiver between your head and shoulder is especially harmful, because it puts added stress on your neck muscles.) If you're on the phone a lot, consider a lightweight headset or a speakerphone so you can keep both hands free. Also make sure that you have enough room to write comfortably, without reaching awkwardly to either side. Perhaps you can set up a separate writing surface, such as an elevated desk return or cubicle work surface, that you move your chair to use. Be sure to move equipment as you change tasks—the equipment you use at the moment should be in front of you or in easy reach.

Your Mac Setup

Computer peripherals—especially keyboards and pointing devices—have received a lot of attention from vendors, who love to run ads touting their products' ergonomic advantages. But it's difficult to verify or refute specific claims without access to specialized test facilities and hundreds of volunteer subjects, and even then those results may not apply to you. Be especially suspicious about assertions that a particular product can prevent or heal injuries.

Still, there are things you *can* do when selecting peripherals to get ones that work well with your body and computer setup. While you're shopping, keep in mind that if you've already grown accustomed to a poor design, a better piece of equipment may feel worse when you first use it. Try any piece of equipment before you commit to it, and make sure you can return it after a trial period. In the store, always ask to use a device with a working computer.

Keyboards Keyboards have been singled out as contributing to many CRDs, particularly problems with the fingers, hands, and wrists. Here's what you should pay attention to when you're looking for a keyboard.

- Do the keys provide a comfortable level of resistance? The keys should require more than minimal force to activate, but not so much that they're hard to press.
- The keys should provide some auditory or tactile feedback. You can test this by watching the monitor as you type—can you tell when you've pressed the keys firmly enough to activate them?
- Is the keyboard's angle adjustable? Some ergonomists believe that the keyboard should lie flat, while others advocate a negative tilt, with the front row higher than the back row. Unfortunately, the built-in feet on most keyboards only allow a positive tilt (front row lower than back row), although some keyboard trays let you achieve a negative (backward) angle. You can also tilt your keyboard by attaching a piece of wood or metal to the bottom.
- Does the keyboard provide function keys to help you cut down on the number of keystrokes? (The sidebar "Stress-Reducing Software" shows you how to take advantage of keyboard shortcuts and other actions to save wear and tear on your fingers.) Does it provide scrolling keys like page up and home to minimize mouse movements?
- Does the keyboard provide any other ergonomic enhancements? For example, a numeric keypad that you can shift to the left side of the keyboard may be better for left-handed users, and a built-in trackball or other pointing device can help minimize arm and hand movement.

Apple and various third-

STRESS-REDUCING SOFTWARE

You work at the computer all day, and you know you're at risk. After you've adjusted your workstation and learned the appropriate body mechanics, what else can you do to reduce the risk of repetitive strain injuries (RSIs)? Get your computer to do more of the work *for* you.

Make the Mac Do the Work Store commonly used phrases and paste them from your word processor's glossary. Microsoft Word 6.0 offers a technology that automatically corrects commonly misspelled words and replaces preconfigured abbreviations. Two programs offer similar capabilities for almost any program: Riccardo Ettore's TypeIt4Me shareware and Magic Typist 2.0 from Olduvai Corporation ($29, 305/670-1112). System 7.5 supports scripting of both AppleScript-compatible programs (like QuarkXPress) and the Finder, so you can automate common tasks, even across programs. Other programs, like FileMaker Pro, offer their own scripting. Charles River Analytics' Open Sesame ($99, 617/491-3474) also lets you automate common tasks.

Avoid the Mouse Apple's Easy Access, which came with your system software, lets you use the numeric keypad as a mouse, and it also provides Sticky Menus (which keeps a menu displayed until an item is selected) to reduce motion.

Use Shortcuts Reduce your keyboard efforts with CE Software's QuicKeys ($139, 515/221-1801) and Dave Lamkins' PwrSwitcher 1.1.3 shareware.

Use Your Voice AV Macintoshes support voice commands for Finder functions; that functionality should increase as vendors add PlainTalk support to their products. Articulate Systems' PowerSecretary ($2495, 617/935-5656) lets you enter text into a word processor by speaking.

Take a Break Several programs can help you remember to take breaks: Visionary Software's LifeGuard ($79.95, 503/246-6200), Exercise Break from Hopkins Technology ($39.95, 612/931-9376), and Coffee Break, a shareware program by Thomas Reed. Or just set alarms using Apple's Alarm Clock desk accessory.

I've posted the shareware mentioned here, plus a "Top Ten Things to Do with QuicKeys" file with some examples in the *Macworld* forums' software libraries on America Online and eWorld.

BY JOANNA PEARLSTEIN

party vendors have introduced newer designs that promise improved hand and wrist positions. For example, the Apple Adjustable Keyboard ($219 company-estimated street price, 408/996-1010) splits down the middle to lessen sideways turning at the wrist, and the Comfort Keyboard System ($795, HealthCare Keyboard, 414/253-6333) consists of three sections that adjust separately to fit your hands. More radical approaches like The BAT chord keyboard ($349, Infogrip, 805/566-1049) claim to reduce wear and tear by doing away with most of the standard keys; instead, you use key combinations called chords to enter letters and other characters. Although hard data is scarce, individual users have reported that alternative keyboards can make the difference in some cases. (See "The Apple Adjustable Keyboard," *Macworld*, November 1993.) However, other users dislike these devices.

Pads and Braces Wrist pads and other add-ons offer an inexpensive solution for some deficiencies in keyboards and other hardware. Padded wrist rests that sit in front of the keyboard are quite popular, but Pam Silverman, a hand therapist and director of Hand Therapy of San Francisco, cautions that you should never brace your wrists on them while you're typing, because the added wrist pressure may actually *increase* the risk of some CRDs.

According to Silverman, wrist splints can help sore wrists heal, but they're best used under direct professional supervision. It's important not to wrap your wrists too tightly, since that can make matters worse by aggravating nerves and blood vessels.

Pointing Devices With all the attention paid to keyboards, don't forget your pointing device. Many repetitive-strain-injury (RSI) experts say that the mouse and other pointing devices are becoming a major source of injury because people hold them incorrectly throughout the working day. Each major category of pointing device has its own legion of supporters—you should choose a device that feels comfortable to you and that works for the type of job you do.

Emil Pascarelli, an M.D. and director of ambulatory care at St. Luke's/Roosevelt Hospital in New York City, notes that mouse users increase their risk of injury by gripping the mouse too tightly. If you opt for a mouse, choose one that fits comfortably in your cupped hand. People who suffer from arm and shoulder pain may get relief by switching to a trackball, which requires less arm movement than a mouse to manipulate. Hands come in different shapes and sizes, so try to find a mouse or trackball that fits yours.

When shopping for a trackball, consider how resistant the ball is to movement. If the ball moves too easily or not easily enough, you'll have to work harder to control it using the small muscles in your hands and fingers, which are more prone to injury.

Pay attention to the placement and size of the buttons: Are they easy to reach and press, and do they provide adequate feedback? If you use the mouse or trackball a lot, look for user-definable shortcut keys to, say, replace a more stressful double-click with a single-click, to avoid the gymnastics of shift-clicking to handle multiple selections, or to save you the effort of switching back and forth from the mouse to the keyboard.

People who do a lot of graphics work, but not much word processing, may prefer a pen-based input device like a drawing tablet.

TIGHTLY GRIPPING

And since most input devices use the Mac's ADB port, you can plug several in at the same time and switch between them as needed. This lets you pick the right input device for the job—a pen, for example, is better-suited for illustration than a trackball, and a mouse is better than a joystick for fine movements in word processing—and prevents you from overusing one set of muscles and tendons.

Monitor The monitor is another component that plays an important role in certain CRDs, especially eyestrain. The monitor's height should be adjustable so that the top of the visible screen is just below eye level, and the monitor should swivel to help you get rid of annoying reflections. (If you have to pivot the monitor too far, you should try to eliminate the source of the reflections.) Choose a display that's sharp enough to read without straining your eyes, and one that's bright enough to match the ambient lighting.

A Healthy Ambience

Many computer users don't pay much attention to lighting and other environmental conditions, probably because they assume that anything outside of their immediate work area is beyond their control. In practice, though, small changes in your environment can have a major effect on your comfort level, and may help avoid some types of CRDs.

Lighting In designing lighting for a computer workstation, the most important goal is to strive for balance. As a general rule, the light coming from the monitor itself should match the brightness of the ambient lighting: a screen that's too dim or too bright can cause eyestrain. You should try to avoid glare and bright spots, which can also cause eyestrain and headaches. (In some cases, however, these symptoms may simply mean that you need new glasses or contact lenses.)

If your overhead or other lights are too bright and are causing reflections or are overpowering your monitor's display, you can solve the problem inexpensively by making a cardboard shield for your monitor, wearing a baseball cap or eyeshade, or changing the angle of the light. (Don't place paper over a light to diffuse it—you're creating a potential fire hazard.) If your office has fluorescent lighting, try removing one or two bulbs from the fixture directly over your work area.

If your work space has an outside window, make sure the window is not in front of or behind the monitor screen—daylight will overcome the monitor, making the screen hard to read and increasing your chance of eyestrain. Placing the monitor screen at a 90-degree angle from the window is the best choice.

Air Comfort Second-hand tobacco smoke is only the most notorious example of poor air quality that can endanger a worker's health. Fortunately, most businesses have come a long way in regulating exposure to smoke and other pollutants in recent years. Not so obvious, though, are the ways in which other conditions, such as temperature and humidity, can affect your health.

For most people, a working temperature of about 68 degrees Fahrenheit (20 degrees centigrade) is ideal, although some people feel their best in warmer or colder conditions. (If you're especially bothered by temperatures that don't seem to affect your coworkers, check with your physician, since some medical conditions—thyroid disease, for example—can affect temperature sensitivity.)

Cheap Fixes A cardboard hood can cut monitor glare, and a cardboard shield can cut noise from recessed equipment.

Very low humidity also bothers most people and can cause symptoms like dry eyes, nose, and mouth. (Contact-lens wearers are particularly susceptible, since their eyes are usually already dry from blinking less. People also tend to blink less often when working with computers, TV, movie screens, or other bright sources than they do in other situations.) Depending on the type of building you work in, it may be possible to adjust the temperature and humidity to your liking.

Noise Whether it's the constant hum of a disk drive or the incessant chattering of a coworker at the next desk, noise in your work area also can cause harm by increasing your stress level. (Many experts, including hand therapist Silverman, believe that people who are under stress are more prone to develop CRDs than people who are relaxed.) You can cut noise levels by placing offending equipment on the floor, and you can use padded partitions to muffle noise from adjacent areas. If you're particularly sensitive, you should consider wearing earplugs or lightweight headphones that cover your ears.

Adjusting Your Work Habits

Initially, it may seem strange that typewriter users tend not to suffer from RSIs—after all, for many people, using a computer mostly involves typing. But even electric typewriters only let you work in spurts; at the end of each page, you have to change the paper, and that gives the body a brief but welcome respite that computer operators don't enjoy.

Even more important, says Pascarelli, is the fact that, because of how a typewriter is designed, typewriter users can't rest their arms on the edge of the desk the way computer typists can. (Resting the arms that way while typing can lead to injury.)

When you're using the keyboard, your forearms and wrists should form a straight line, and your fingers should adopt a comfortable, natural curve downward. As you type, don't apply too much pressure on the keys. To avoid CRDs, take frequent, short breaks. At least once an hour, stop what you're doing and get up and stretch your body, arms, and legs. To give your eyes a rest, look away from the screen every five minutes or so and stare into the distance. And of course, don't overwork or work when you're in pain.

When you do make changes, make sure you give yourself time to adjust. Your body feels comfortable with the familiar, not the unfamiliar, and it may take as much as a week to know whether a particular work setup or set of work habits is going to work for you. And you may need to change your setup and habits over time. Your body is not static, and neither should your work be.

A MOUSE CAN CAUSE ARM DAMAGE

PART THREE

WHERE TO GET **HELP**

APPLYING A FEW PREVENTIVE measures may be all the therapy you need if you're suffering from a mild form of computer-related disorder (CRD), so you may not have to consult a health practitioner. But if you have even the slightest uncertainty about what to do, or if your symptoms are likely to result in some sort of insurance claim, it's wise to seek outside advice. (If your symptoms are job-related, you may be required to visit a company physician first.) Also, remember that it's *never* a good idea to try to "work through" an injury by ignoring it, since that may make the problem much worse.

Computer users who suffer from CRDs face a dizzying choice of places to turn to for help, ranging from medical doctors to proponents of various forms of alternative therapy. There's also a huge assortment of reference materials. I've listed the best on *Macworld*'s forums on America Online and eWorld. Here's a brief rundown of the major medical options.

Choosing a Caregiver

Although most physicians (M.D.s and D.O.s) have probably heard of conditions like carpal tunnel syndrome, few receive intensive training in dealing with CRDs. Your best bet is to look for a board-certified doctor who specializes in hand surgery, or physical or occupational medicine. (If you're having visual symptoms or headaches, see an optometrist or ophthalmologist.)

Ask other computer users in your area for referrals, and take the time to interview potential candidates: how extensive is their background in diagnosing and treating CRDs, and what is their approach to therapy?

If you don't like the advice you get, consider a second opinion, but be aware that your medical insurance may not cover it—check with your insurance carrier. Also, be aware that workers' compensation often limits your ability to change doctors once treatment has begun.

A variety of other practitioners—including chiropractors, occupational therapists, hand therapists, and physiotherapists—can also treat CRDs. (In many cases, these practitioners work along with or are referred by physicians in occupational medicine and other specialties.)

Some RSI sufferers have also obtained relief with alternative therapies such as acupuncture, meditation, and relaxation techniques. Although I try never to dismiss any approach out of hand, it's important to remember that some treatments, including medication, may only mask the symptoms without doing anything to correct the cause and prevent further injury.

As always, rely on personal recommendations for referrals, and beware of therapeutic claims that seem too good to be true.

Although it's impossible to make any workplace completely risk-free, following these simple guidelines should help make your computing experience safer and more rewarding. m

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FRANKLIN N. TESSLER, M.D., is a radiologist and *Macworld* contributing editor with a special interest in computer-related disorders.

REPETITIVE STRAIN INJURY TREATMENTS

by Robert E. Markison, M.D.

While treatment for repetitive strain injuries will vary from person to person, use these general guidelines in consultation with a medical provider. Good diet, exercise, keeping the arms and hands warm, varying your activities, taking breaks, staying well-hydrated, avoiding caffeinated beverages, and not smoking all help reduce injury and speed recovery.

Poor Posture	**Self-help:** Do breathing and stretching exercises, get a chair that supports correct posture, reduce stress, avoid extra body weight. **Professional care:** Physical therapy, local anesthesia via trigger-point injections.
Cubital Tunnel Syndrome and Ulnar Tunnel Syndrome	**Self-help:** Keep arms and hands warms (via clothing and fingerless gloves), don't overuse hard-to-reach keys, try alternative keyboards and input devices, don't keep arms in a palms-down position. **Professional care:** Varies.
Strained Pronator	**Self-help:** Avoid sustained pronation, do gentle massage and stretches, keep arms and hands warm (via clothing and fingerless gloves). **Professional care:** Varies.
Carpal Tunnel Syndrome and Flexor Tenosynovitis	**Self-help:** Take breaks, keep arms and hands warm (via clothing and fingerless gloves), avoid salt, don't smoke (it reduces blood flow by as much as 60 percent), use dictation or voice recognition, type more gently. **Professional care:** Night splints, hand therapy, steroid injection if recommended.
DeQuervain's Tenosynovitis and Thumb Ligament Strain	**Self-help:** Change use of thumbs for pressing spacebar (for example, use rolling thumb movement or alternate use of thumbs), do gentle massage and stretches, keep hands warm (via fingerless gloves). **Professional care:** Night splint, steroid injection if recommended.
Extensor Wad Strain	**Self-help:** Avoid sustained pronation, do gentle massage and stretches, keep arms and hands warm (via clothing and fingerless gloves). **Professional care:** Physical therapy, steroid injection if recommended.

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The new 30-bit Umax color scanner in Graphics news, page 130.

Graphics

130 **News** Umax 30-bit scanner • Macromedia FreeHand 5.0 • Plug-ins for Adobe Illustrator, and more

132 **Expert Graphics**
BY CATHY ABES Graphics professionals share their secrets.

At Work

134 **News** Point-'n'-click SQL queries • Real-time conferencing • Newton MessagePad 120, and more

137 **Working Smart**
BY JIM HEID Business information via modem.

143 **Quick Tips**
BY LON POOLE Tips, tricks, and shortcuts.

Networks

148 **News** Apple's Open Transport • PACE-enhanced Ethernet • LANsurveyor's new look, and more

151 **PowerBook Notes**
BY CARY LU Is your battery running out of time?

ON THE COVER
Photo by Stan Musilek

Buyers' Tools

163 **Editors' Choice**
Top picks from our comparative articles.

165 **Star Ratings**
Hardware and software reviews at a glance.

179 **Streetwise Shopper**
Hardware and software bargains: discounts, bundles, upgrades.

Apple's fastest Power Mac yet, the 8100/110, in Reviews, page 50.

14 **How to Contact Macworld**

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Reviews

50 **Power Macintosh 8100/110**
Macintosh computer

52 **LaserWriter 16/600**
Workgroup printer

53 **Nisus Writer 4.0**
Word processor

55 **PixelPaint Pro 3.01**
Color paint program

57 **Apple PCMCIA Expansion Module**
Expansion option for PowerBook 500 series

59 **Adobe Acrobat 2.0**
Portable-document software

61 **Ray Dream Designer 3.1.1**
3-D–graphics program

63 **DigiTrax 1.1**
Audio-recording software

65 **Performer 5.02; Vision 2.08**
Music software

67 **Brainstorm Accelerator for the Macintosh SE**
Upgrade kit

69 **French Assistant 1.0; Power Translator 2.0**
Foreign-language translators

71 **StuffIt Deluxe 3.5**
Compression utility

73 **QuickCam**
Digital video camera

73 **Bookends Pro 3.1**
Reference-creation tool

75 **DiskGuard 1.0.1; DiskGuard Remote**
Security software

77 **Panelight ZX**
LCD panel

77 **ACT 2.0**
Contact manager

79 **MacDraft 4.0**
2-D CAD software

79 **Statistica/Mac 4.1**
Statistical software

81 **A.D.A.M. The Inside Story**
Multimedia anatomy program

81 **WarPlanes**
Multimedia military-flight CD-ROM

83 **Mouse Deluxe Mac**
Three-button mouse

83 **Kids World 1.01**
Screen-saver creator

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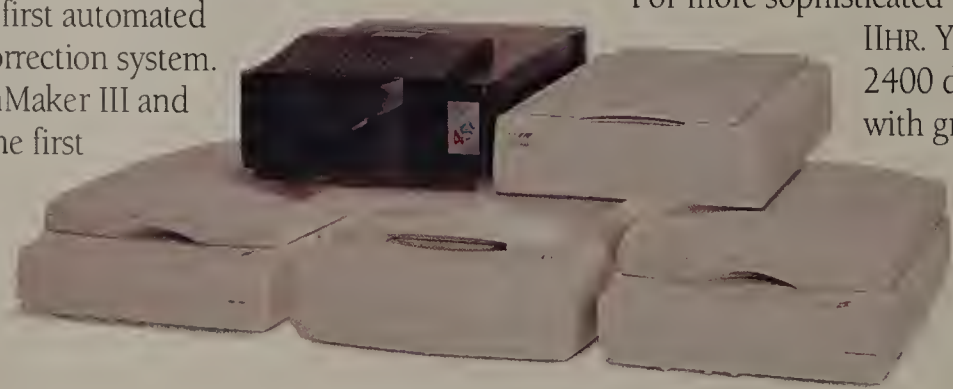
Want color but don't want to spend big bucks? Look into the ScanMaker II — you get 24-bit color flatbed scanning *and* Adobe Photoshop LE for around $550.

Looking for a fast, single-pass scanner for office and graphic applications? The ScanMaker IISP, winner of two Editors' Choice Awards from *PC Magazine* and *Imaging* magazine, has software enhanced resolution up to 1200 x 1200 dpi and a street price around $750.

For more sophisticated applications, there's the ScanMaker IIHR. You'll get resolution up to 2400 x 2400 dpi — which makes it very popular with graphic artists — and a price from around $800 to $1100, which makes it very popular, period.



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For the most demanding work, the ScanMaker 45t offers photographers and graphic artists software enhanced resolution of 2000 x 2000 dpi for scanning transparent images up to 5" x 5" at a street price around $6500. It offers a level of quality that, until now, was only available to professionals using costly drum scanners.

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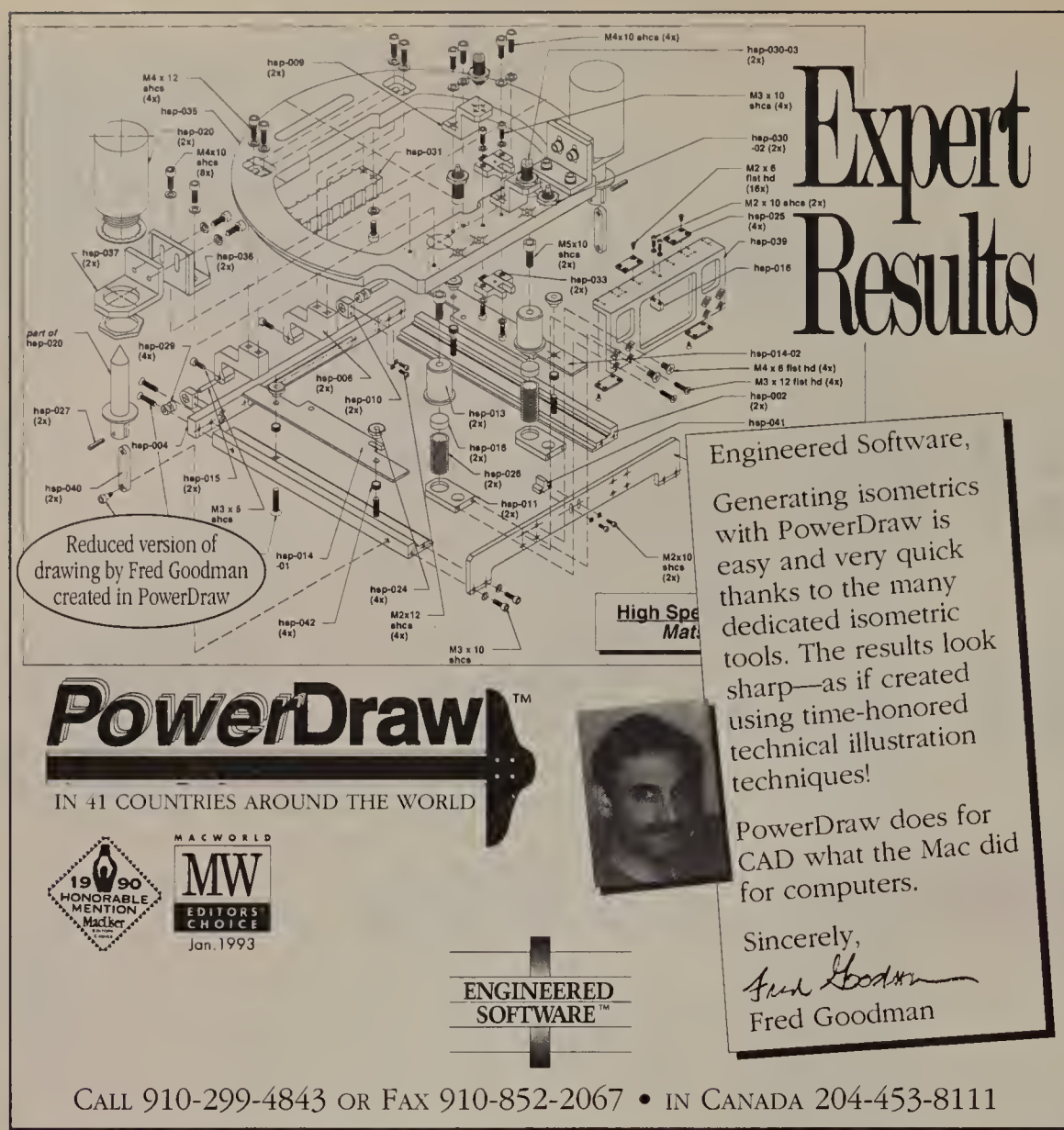

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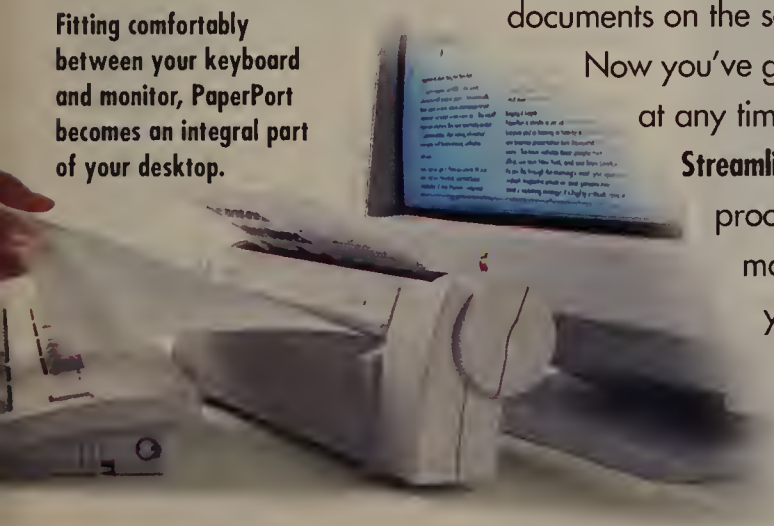

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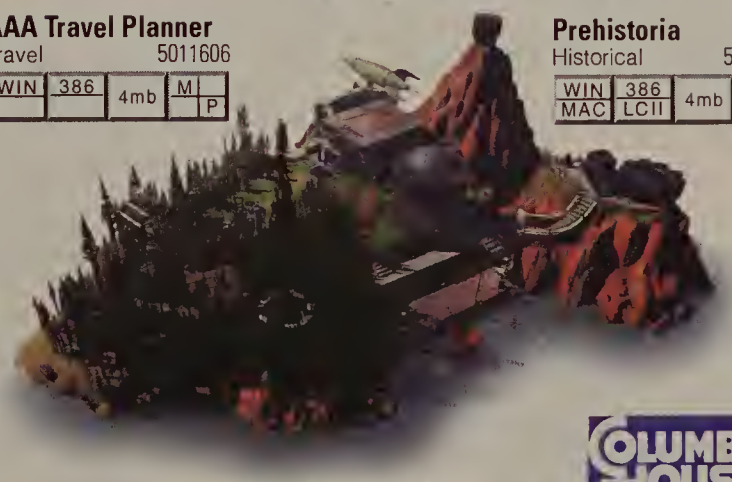

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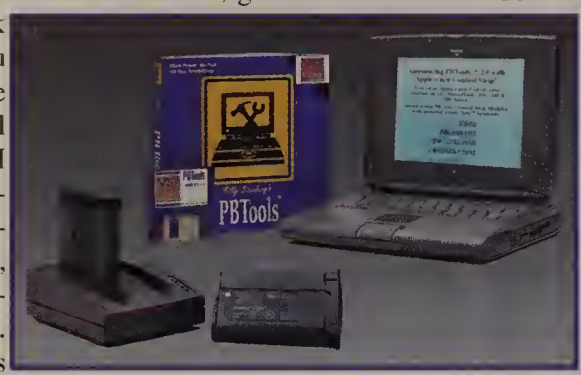

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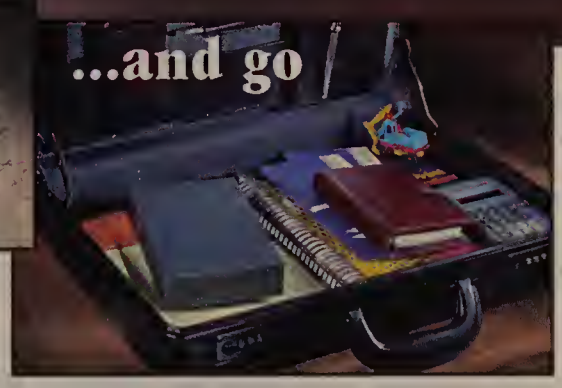

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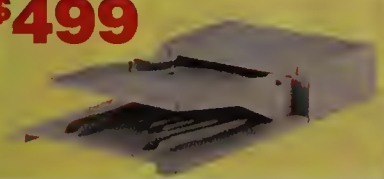

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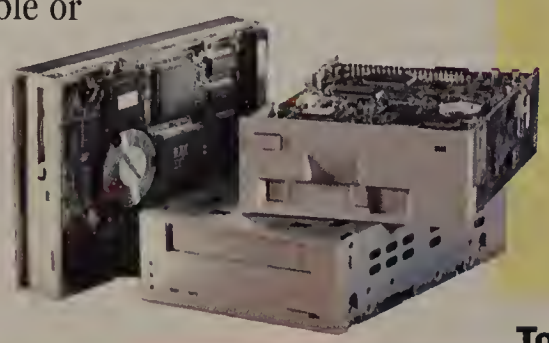

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Circle 52 on reader service card

BY ADRIAN MELLO

Divide and Flounder

How the Pentium became The Error Inside

A FEW YEARS AGO THERE WAS quite a furor when children around the country pulled the string on the back of Teen Talk Barbie and their favorite doll said, "Math class is tough." The marketeers at Mattel, no dummies they, now offer Astronaut Barbie, whose box is printed with the motto "We girls can do anything." Now that Mattel has improved its attitude toward the very young women who use its products, it's time for Intel and Microsoft to show that they respect their customers, too.

After the floating-point division problem with Intel's Pentium became a hot potato (see "Pentium Dementium," *MacBulletin*, February 1995), there was another surprise: the Calculator applet (small application) in Microsoft Windows 3.1 and Windows for Workgroups—used by nearly 60 million people—can't do arithmetic properly with some small numbers. Perhaps when balancing his checkbook, Bill Gates got too used to adding up numbers that have at least six zeros in them and failed to notice that 2.01 minus 2.00 is not 0.00. Perhaps Intel and Microsoft should have heeded Teen Talk Barbie's warning to us all on the inherent difficulty of mathematics.

To be fair, math *is* hard, especially on computers. Digital binary math can only approximate some numbers that can be written easily and accurately on paper—⅓ or π, for instance. A computer could spend its life calculating .3333333 for the first example, or 3.14159. . . for the second. At some point a computer has to round off, so there's a trade-off between accuracy and speed. For certain very sophisticated math, an entire cottage industry is dedicated to creating algorithms that help computers do specific kinds of calculations more accurately.

Nor has the Mac been problem-free: witness the spotty history of SANE (the Macintosh Way of Math). The PowerPC family has also had some flaws. For example, the version of the 601 that ships in Apple's upgrade cards has some problems with transcendental calculations. The PowerPCs that ship in complete Power Macs are fine, but that situation may explain why Apple has been remarkably low-key, not yet openly criticizing Intel.

Like Intel with its Pentium flaw, Microsoft has known about the Windows math problem for some time and planned to fix it in the next version. Unlike Intel's corrected Pentium, however, which is shipping now, Microsoft's Windows 95 (or is it Chicago 93? I get confused) is not due until April or May or now maybe August. An embarrassed Microsoft said at press time that it would post a repair patch online on January 6, 1995. But what's really remarkable about the Intel and Microsoft imbroglios is that both companies knew about their problem, and neither said anything to the public until the bits hit the fan.

DON ARDAY

As I write, reports are coming in of real-world instances of corrupted data resulting from the Pentium flaw. Intel's estimate is that a typical user would get only one significant error every 27,000 years or so. My, how time flies. Unfortunately, time will not fly for the many organizations and individuals who now have to check their work. They need to figure out how much of it may be flawed, find another computer to run their calculations on, run the calculations, and then compare them. A number of suits have already been filed, and it's possible that Intel will find itself settling with folks who have lost time and therefore money. There could be a domino effect: users filing suits against Intel or their computer vendor and then the vendors suing Intel because of the loss of their time, the loss of sales that could have been made while they were fixing problems, and the damage to their reputations.

As I write, two stockholder suits have been filed against Intel. They'll no doubt claim that, since Intel had known about the flaw since last summer, stockholders should have been told of the possible impact on Intel's financial performance and stock price. The stock has rebounded since Intel president and chief executive Andy Grove announced, seven weeks after the furor began, that Intel would replace any defective Pentium on request. Keeping a problem like this secret is a classic way to get sued by stockholders and lose.

And Intel vastly underestimates users' capacity for outrage when their concerns are dismissed in a high-handed way. Intel's early policy of replacing chips only if the company judged it necessary was outrageous. Although Grove apologized for the problem, the company dragged its heels before relenting. That may cost it a sum of lost prestige that is incalculable. As one of the strongest technology companies in the world, Intel will recover. But stumbles like this—and pride before and after the fall—have led juggernauts such as IBM to tumble from the PC heights.

Ship in Haste, Repentium at Leisure

In personal computers, a new generation comes every two years or less. For this reason, computer juggernauts crash faster than those in other industries. Faced with new competition from the PowerPC and

continues

from clones, Intel adopted several strategies to regain its virtual monopoly. It rushed the Pentiums to market—as it had done with earlier generations of the 80X86 family—as if it were too anxious to leave the competition behind. Also, the seeming point of using the trademarked name *Pentium*, instead of the expected name 586, was to prevent competitors from using an Intel designation—as the courts said those competitors could use the term 486, for instance.

Intel also used other monopolistic strategies: it dropped prices on the Pentium rapidly, came out with speedier chips more quickly, promised a next generation that would be even more powerful, and spent around $100 million promoting its chips to the general public. That raised the company's profile and exposed it to more brickbats.

This pattern of behavior shows that, like Microsoft, Intel is constitutionally incapable of tolerating rivals. Sadly, those who feel a need to crush their competitors often succeed only in creating real enemies. The Intel arrogance is now clear to the public, and that revelation has filled the company's rivals with new hope and determination. Soon after the issue broke, several prominent commentators in major daily newspapers suggested that their readers consider the Macintosh.

Also, as operating systems move to support multiple processors, there will be no guarantee of customer demand for any one chip architecture. Although it is unlikely, should any future generation of Intel chips have some grievous flaw, or more to the point, should the PowerPC prove a dominating competitor, Microsoft would be able to move its software to the next champion among chips. Microsoft has already spent a great deal of money to make Windows portable by creating Windows NT, which can run on several microprocessors, including Pentiums and PowerPCs. With this kind of portability in the offing, and with the Apple/IBM/Motorola converged platform a year or so away, no one should take anything for granted.

Intel's Andy Grove should be proud of his company's success over the years, and he should be ashamed of this episode. It's time for a lot of soul-searching for Intel, and time will show how seriously the company takes this debacle to heart. This is clearly an opportunity not only for the makers of chips designed to work like Intel processors (IBM, NexGen, Advanced Micro Devices, and Cyrix—that's a lot of competition nipping on Intel's right heel while the PowerPC nips at the left), but also for the Mac and PowerPC.

But one question remains: is Apple poised to take advantage of this windfall? Even before the Pentium problem, the PowerPC Macs had proved worthy competitors. And when Copland (System 8) gets rid of the System 7.X overhead that makes a PowerPC merely as fast as a Pentium, watch out. Unfortunately, Copland has also been delayed—to mid-1996. Apple needs to grab this chance, and the company is slipping already.

A word to Apple chief Michael Spindler: the stars are in alignment. If you don't plan to at least double Apple's shipments in the next year, you aren't planning to succeed. I've covered both Apple and the PC-compatible world over the years, and my experience tells me that the well-marketed mediocrity of PC-compatibles has succeeded beyond its merits. There's an opportunity now for that to change. I say, may the best Mac win. m

Senior associate editor TOM MORAN contributed to this report.

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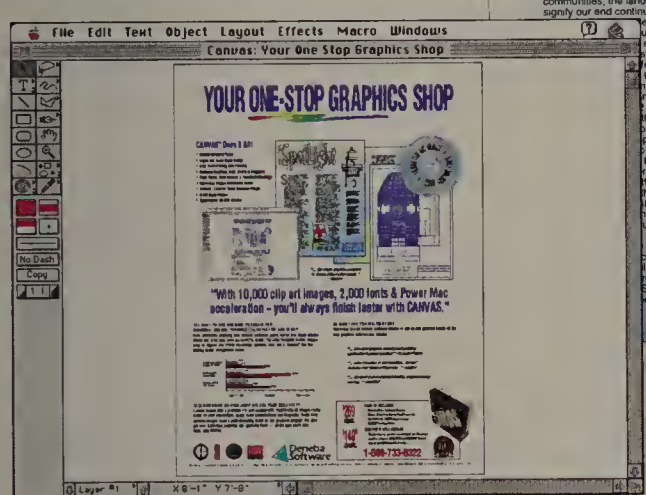

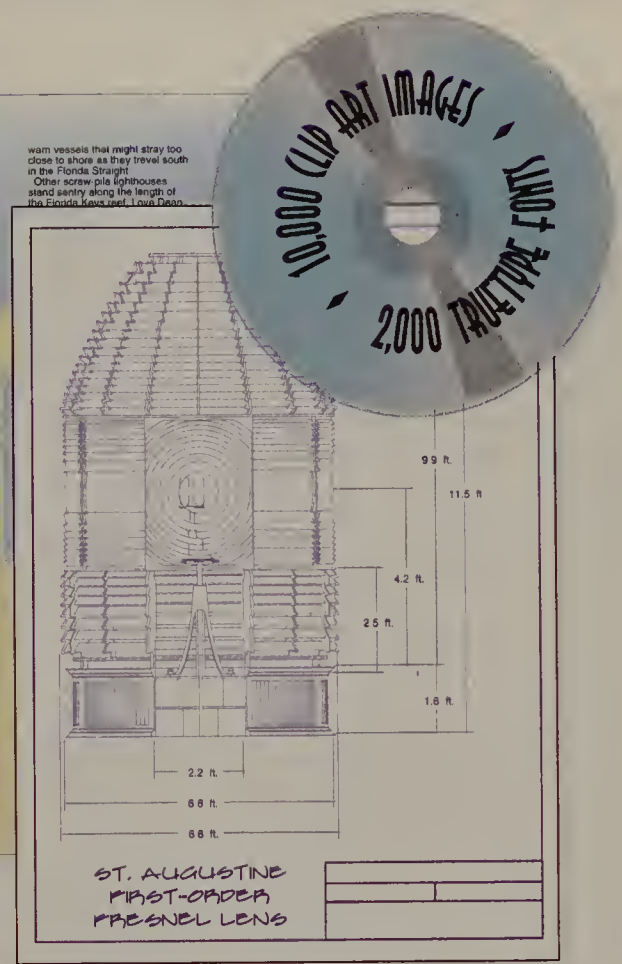

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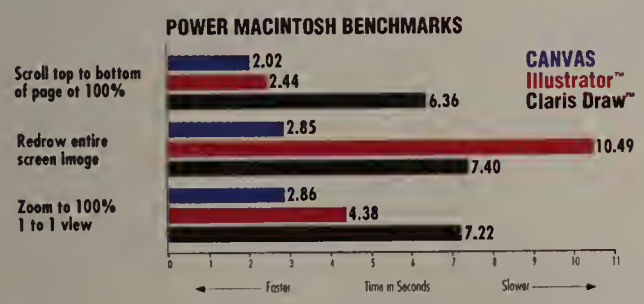

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Circle 57 on reader service card

Apple Peripherals

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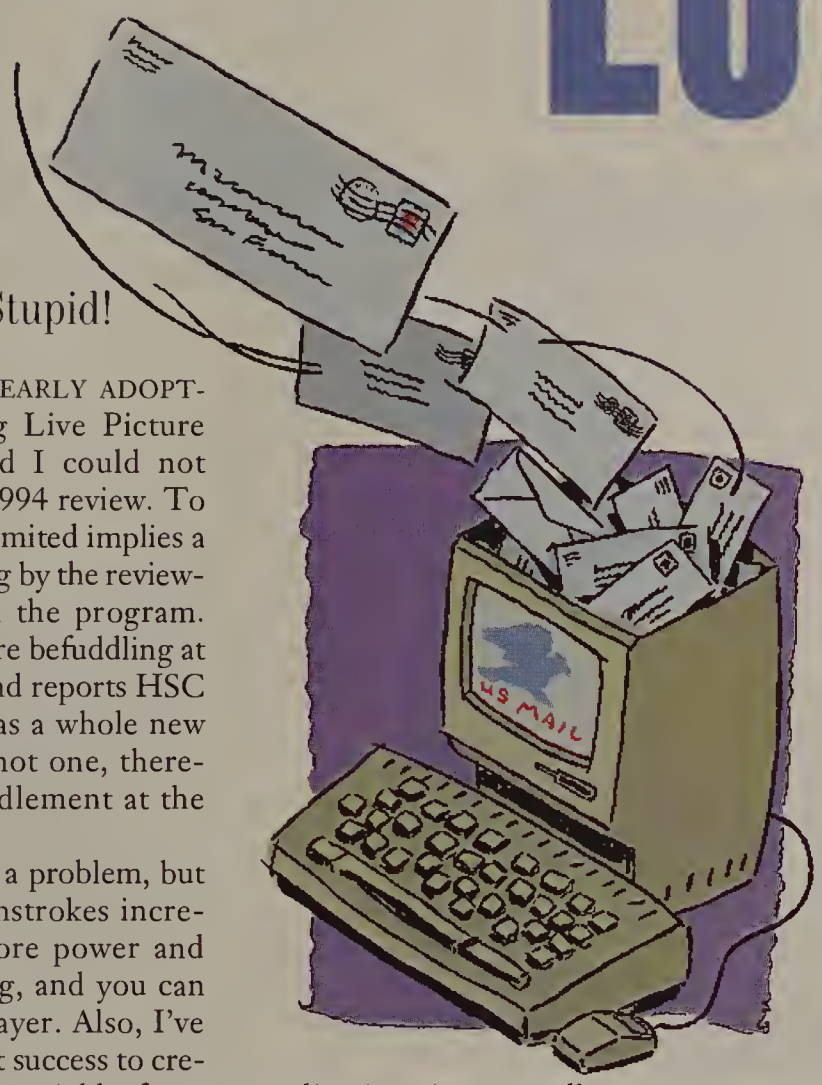
MARCH 1995

Letters



WARD SCHUMAKER

It's the Interface, Stupid!

AS A LIVE PICTURE EARLY ADOPTER, I've been using Live Picture since January 1994, and I could not believe your December 1994 review. To describe Live Picture as limited implies a very limited understanding by the reviewer of how to work with the program. Admittedly, the layers were befuddling at first. But Deke McClelland reports HSC describing Live Picture as a whole new way of working. Might not one, therefore, expect some befuddlement at the beginning?

Deke says undoing is a problem, but you can wipe away brushstrokes incrementally, giving you more power and control over your editing, and you can always delete an entire layer. Also, I've used Silhouette with great success to create complex masks very quickly from multihued images.

According to Deke, not being able to change the size of the composition window limits positioning an imported image. But because of the way Live Picture works, the size and position of the image when you insert it isn't that important. You can plop the image in anywhere at any size and easily and quickly scale and position it later.

He further criticizes Live Picture for not having the Macintosh Clipboard features available, but the layers are essentially a clipboard. You can "paste" things there and use them anytime, edit them, move them, delete them, or temporarily hide them.

Finally, Deke says you can apply gradients only to rectangles, but this is not true. You can make a gradient and apply a stencil of any shape.

Deke spent several pages describing a piece of software that operates like no other image-editing program and demonstrating by his comments that he didn't fully grasp the program. Then he concluded that Live Picture does not measure up to HSC's claim that the application is a totally new way to approach image editing.

Warren Morgan
Portland, Oregon

REVIEWER DEKE McCLELLAND missed his prunes the day of his Live Picture review. Anyone composing letter-size images for CMYK output in a publication is working with 40MB per image. Composite just two of these images together, and you are at 80MB. Photoshop (and other pixel-based programs) requires three times the file size in available RAM, but current Macs can hold only a maximum of 256MB, so you're at the wall and into the scratch disk, waiting on hard-drive access times. Live Picture works at the same speed whether it's chewing on a 5MB or 500MB file.

Gary Shilling
via America Online

IN RESPONSE TO DEKE McCLELLAND'S review of Live Picture, "expensive" is relative. Ask the Scitex and Eclipse owners to do a 3000-pixel airbrush. After working with Live Picture for a year, I find myself using it daily and doing things that in the past would require a high-end dedicated system or lots of time in Photoshop. If you scared anyone any from purchasing it, let's hope it's my competition—*I'd* buy it again!

Paul Figura
Jacksonville, Florida

If a change is a change for the better, I'm all for it; if not, I'm against it. I *do* expect some learning time when using any new program, but Live Picture's interface distinctions are sometimes arbitrary and do not well serve the user. The Sharpen/Blur layer, the one-direction Silhouetting function, and the gradient tool are all examples of incomplete functions that—while different—fail to deliver as well as tools in less expensive programs. The standard window size button is inoperable exclusively when importing an image; otherwise it works fine. This does not suggest a considered feature, but rather an oversight. Regardless of its intention, no purpose is served by turning the function off.

Similarly, no function is served by turning the Macintosh Clipboard off, as the purpose of the Clipboard is to allow you to move elements between documents. By disabling the Clipboard functions and prohibiting you from opening multiple compositions at the same time, Live Picture makes it impossible to swap images between documents. Suppose you have two compositions and you want to transfer images from the first into the second. Presently, Live Picture provides no mechanism for doing this.

As I stated in the review, Live Picture is well equipped in the technology department. The program is lightning fast at most operations, especially on the Power Mac, and it allows you to open and edit fantastically large images. In fact, if speed and access to enormous images are all you expect for your $4000, then Live Picture will not disappoint. However, if you want a flexible interface combined with professional-caliber tools, then the program still has a ways to go.—Deke McClelland

Modelers Not Picture Perfect

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Circle 159 on reader service card

CORRECTIONS

■ *In the January 1995 Wiz Tools for PowerBook review, the Con referring to an incompatibility with System 7.5 should not have appeared. Wiz Tools is System 7.5 compatible.*

■ *The correct price for Presenter Professional 3.0 is $1995 ("Inside 3-D Modeling," December 1994).*

■ *The January 1995 review of ClarisDraw 1.0 incorrectly states that you can't edit bitmapped images. You can display and edit 24-bit images after you import them using the provided translators. You can also save up to nine zoom views for later use. ClarisDraw 1.0 is accelerated for the Power Macintosh.*

■ *The January 1995* Desktop Critic *mistakenly attributes product information to The Presenter Mac/PC TV adapter from Consumer Technology Northwest. This information applies to the Power Presenter from JJ &K Enterprises. We regret this mistake and look forward to reviewing The Presenter Mac/PC in a future issue.*

Mr. Martinez's article on 3-D modeling in your December 1994 issue ("Inside 3-D Modeling").

But while your article did a good job of explaining the basics of 3-D modeling, it didn't come close to giving the reader enough information to make an educated decision about which product to buy.

I have already purchased Ray Dream Designer and Alias Sketch and found both programs lacking. Ray Dream was an obtuse and limiting modeler—almost useless to anyone serious about 3-D. And Alias Sketch 2.0, while a good rendering program, suffers as a competent modeler.

Also missing from your article was some kind of score on how well some functions were implemented in the products you reviewed. You should also rate these products on technical support.

Chris Lockwood
Houston, Texas

As you've discovered, no one 3-D package is the best in all criteria. We focused on the rendering engine, since it's such a fundamental element, but users should always factor in their individual needs before making a purchasing decision.—Ed.

Ease Up on the 150

I DON'T FEEL THAT YOUR REVIEW OF the PowerBook 150 was at all fair (December 1994). It is much speedier than my PowerBook 145, a pound lighter, and has a better display. I haven't noticed the passive-matrix-eyestrain blues that you gripe about. And the model that the 150 replaces, the 145B, doesn't have a video-out port either.

As for pricing, in the back of your own publication, there were 150's from as little as $1349. At $100 less than the old 145B, Apple's new PowerBook 150 is a wonderful replacement that is sure to win many hearts, including mine as soon as my PowerBook 145 is out of warranty in June 1995.

One last thing—the absence of that little door on the back is a blessing. Those doors should have recycling codes stamped on them because they break so often.

Andy Byrne
via America Online

Two-Line Fax Solution

I HAVE A SOLUTION TO THE ONE-LINE phone/fax problem that is elegant and nearly foolproof but is hardly ever mentioned in articles, including your "Fax or Fiction?" piece (December 1994). Call your phone company and order the service that gives you a separate number on your line, each with a distinctive ring (usually two short rings on the second number, one long ring on the main number). In my area this costs $3 per month for residential lines, $7 for business. I have a box, smaller than your normal ham-and-cheese sandwich, that can tell if the phone is ringing one long or two short and switch the call to different devices, phone and fax or fax modem. The box I bought three years ago is called a Ring Leader, manufacturer unknown, but I have heard them called ring discriminators and they can probably be found at Radio Shack.

David Pyle
via America Online

Web Junkies, Unite!

I THOROUGHLY ENJOYED STEVEN Levy's *Iconoclast* column in the December 1994 issue, on surfing the World Wide Web with Mosaic. Anybody who doesn't understand the importance of knowing the airtimes of "Babylon 5" episodes in Singapore just doesn't get it.

Mr. Levy accurately pointed out the major frustration with Mosaic: the need for speed. He also mentioned that high-speed connections such as ISDN or T1 would cost a lot. But while some regional Bell operating companies retain Paleolithic attitudes toward ISDN pricing,

continues

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others have recognized an opportunity to tap the huge home market and have adjusted their prices accordingly.

I had an ISDN line installed at home mainly to speed up my access to the Web. Here in northern Virginia, Bell Atlantic's prices for ISDN, while higher than those for a regular analog phone line, are no longer out of reach for the Web surfer with the will to tear himself away from his connection long enough and frequently enough to obtain a paycheck.

Brian Goodhart
Falls Church, Virginia

I JUST FINISHED READING YOUR INTERESTING article on Mosaic in the December issue ("Taming the Internet"). As a former member of the team that developed Cisco Systems' Web Server (http://www.cisco.com), I agree with everything you said concerning the present failings of the Mosaic client software.

But I was sad to see that Mosaic Communications' Web browser Netscape didn't receive any print whatsoever. Although it is still in beta form, Netscape is more stable and feature-rich, uses less memory, and performs up to ten times faster over a modem connection than Mosaic. It is available free for personal use from ftp.mcom.com under the /netscape/mac directory. There are versions for Windows and five different variations of Unix.

Fernando Lozano
via the Internet

Unfortunately, when I wrote that article, Netscape hadn't even been named, and Mosaic Communications was still getting up to speed. I agree that Netscape is a better browser, and I currently use it on my Macintosh.—Joel Snyder m

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Letters should be sent to *Letters, Macworld*, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), eWorld (Macworld), AppleLink (Macworld1), or via Internet (letters@macworld.com). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.

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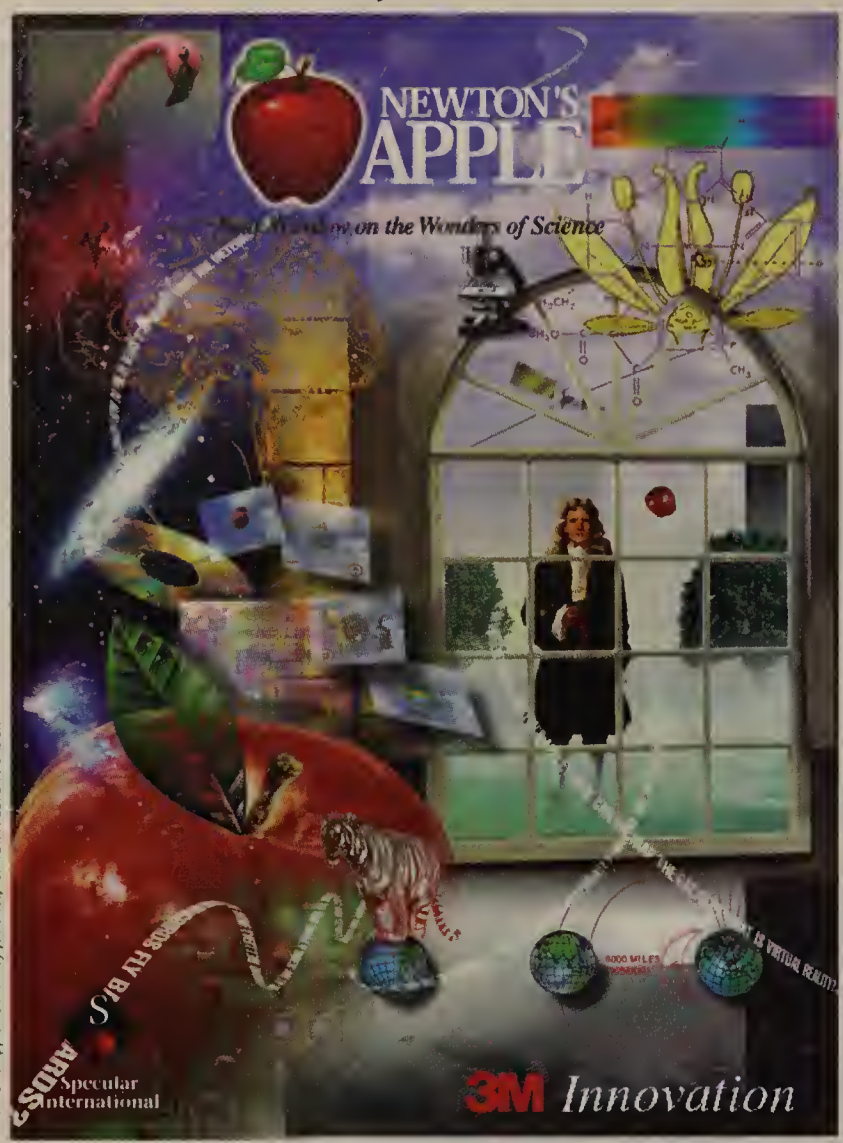
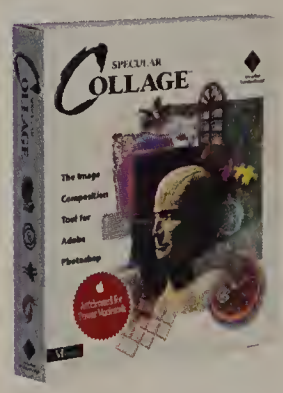


"Newton's Apple" ©1994 by Jeff Brice, for KCTA Public Television

Big ideas often require big images. But are you and your Mac up to it? This poster for the television show "Newton's Apple" contains over 40 layers of images and effects, totalling over 75 MB of data. Normally, working with this much material would slow your machine down to a crawl: move one image (wait), rotate another (wait), make a shadow (wait, wait). And if your client asks you to make any major changes, you'll probably have to start over (wait, wait, wait). Your creativity gets held hostage by the watch cursor. But Specular Collage is different. Collage works with proxies of your hi-res artwork, so you can instantly change anything, at any time, from the position of the apple to the depth of a shadow. Layout tools like grouping, alignment, and a measurement palette make revisions simple and effortless. Specular Collage frees you to do the creative work, leaving the grunt work for the computer. And you don't have to be hit on the head with an apple to see the value of that.



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LATE-BREAKING NEWS

MacBulletin

First 040 Mac Clones Drive reseller Cutting Edge plans to ship the first clones of 040-based Macs by February 1995. The Quatro 850 uses Apple's Quadra 650 motherboard but comes in a tower case that holds up to three 5¼-inch and two 3½-inch drives. The Quatro is available in 25MHz and 33MHz versions. Prices vary by configuration. Cutting Edge also plans to ship Power Mac clones later in the year. 619/441-6992.

Copland Clarified The development team for the next-generation Mac Operating System, codenamed Copland, has told *Macworld* that the emphasis in the new OS, due in mid-1996, will be on rewriting much of the core to make it faster, more efficient in its use of resources, less idiosyncratic in how it deals with low-level system components, more accessible to developers seeking to exploit the full power of the Mac, and less subject to unexpected quits and system crashes. Apple will also revamp the user interface. The Copland developers say they will emphasize user customization, active help, and active assistance. They also promise the new Mac OS will be more "fun."

Copland, Windows 95 Delayed Apple has announced that Copland has slipped from late 1995 to mid-1996. Apple says that Copland's delay is due to changes needed to better support the converged PC platform under development by Apple and IBM and due in late 1996. Microsoft says Windows 95 will now appear in August 1995, not June, so the company can ensure compatibility with the wide range of PC systems and add-on hardware; Windows 95 is now running more than two years behind schedule.

Windows Clients Debut Apple will ship Windows client software for AppleShare with its Workgroup Servers, and Windows client software for AppleSearch with AppleSearch 1.5 ($1799 for one server and unlimited clients) by the end of February 1995 for no extra charge. The AppleShare client is based on an AppleTalk protocol stack licensed from Miramar Systems. The stack is a 32-bit Windows virtual-device driver (VxD), so it should also work in Windows 95. 408/862-3385.

ATI Enters Mac Market A leading developer of video-display cards for the PC, ATI Technologies, has formally announced that it will ship cards soon after the first PCI-based Power Macs ship, which is expected to be in June. The ATI Mac cards will be based on the well-regarded Mach 64 line for PCs, whose prices range from $300 to $800. A preview of the PCI cards shows them to be competitive in performance with current NuBus-based Mac cards that cost two to three times as much. ATI has no plans to release cards for NuBus-based Macs. 905/882-2600.

Macworld Expo Highlights Among the top product announcements at the Macworld Expo in early January were the following:

- STF Technologies' OptiServe, a tiny box that will turn a fax modem into a networked fax server, even over Apple Remote Access. Expected by April, OptiServe should cost less than $500. 816/463-7972.
- Cypress Research's MegaPhone, a $50 program that automates many telephone tasks such as redialing and changing dialing patterns when you travel. It also includes answering-machine software and full-duplex speakerphone capability. MegaPhone is expected to ship in February 1995. Apple will bundle a limited version of MegaPhone with its new GeoPort Telecom Adapter Kit. Cypress, 408/752-2700; Apple, 408/996-1010.
- Software Ventures' Snatcher, a $50 scriptable FTP client for the Mac that logs on to remote FTP sites to download text and binary files, presents all host information with a Macintosh interface. 510/644-3232. m

News

EDITED BY TOM MORAN

IN THIS ISSUE

p. 35 Faster Power Macintoshes **p. 36** Easier Access to the Internet **p. 37** Online Piracy

p. 39 Apple's Power Mac Plans **p. 39** Power Mac Software Wave

p. 130 Umax's High-Resolution Flatbed Scanner **p. 148** Open Transport Moves Along

First Power Macintosh Clones Debut

Power Computing Corporation and Radius have become the first companies to announce Power Macintosh clones. Both companies plan to offer first systems in the spring, perhaps as early as March. The as-yet-unnamed Power Mac clones will run System 7.5 under license from Apple Computer.

Radius Known for its monitors, video-display cards, and motion-video cards, Radius will offer NuBus-based Power Macs configured with Radius products to be complete digital-video production and color publishing systems. The initial Radius Macs will use motherboards either bought from Apple or manufactured from Apple designs (in either case, likely the 8100 motherboard) and add Radius peripherals. For example, a digital-video system might include the VideoVision Studio or VideoVision Telecast video-capture card, a Spigot AV video-display card, VideoFusion software, a RAID system designed using AV hard drives, and a monitor. Pricing, names, and final configurations were not set at press time.

DOUG FRASER

Radius will later offer systems aimed at color publishers. After Apple ships its first PCI-based Power Macs in June or July, Radius expects to offer PCI Power Macs as well, and it is investigating whether to offer a Macintosh with both PCI and NuBus slots (Apple has no plans for such a Mac).

Power Computing The start-up company Power Computing plans to make motherboards for use in other companies' Power Mac clones, complete Power Mac clones for resale by other companies, and its own brand of Power Mac clones. The first Macs from Power Computing are due in the spring, the company says. Power Computing will sell in both the United States and abroad.

The company plans first to sell clones equivalent to the current NuBus-based Power Mac 7100 for less than what Apple charges. Although the amount of discount has not yet been set, the company says it may offer configurations for as little as $1000. Later, the company will sell Macs based on in-house designs.

The year-old Power Computing, based in Milpitas, California, is funded largely

by Olivetti, the giant Italian computer maker.

More to Come While Power Computing and Radius are the first companies to announce an authorized Power Mac clone, Apple says that it has granted licenses to several other companies, which have yet to identify themselves. Among those rumored to have an agreement or be seeking an agreement to produce clones with Apple are Acer, Motorola, Toshiba, Germany's Vobis, and Zenith.

Radius's Mac clone (a prototype is shown here) will focus on video-production and color-publishing users.

One effect of the clones may be to help the NuBus expansion-bus standard survive longer, says Radius CEO Chuck Berger, since clone makers are likely to use NuBus after Apple abandons it this June in favor of PCI. The attractions of NuBus to clone vendors are the proven system designs that exist now for them to use and the large installed base of NuBus cards.

The initial Mac clones differ from the converged-platform PC that Apple and IBM are developing for release in late 1996 (see "IBM, Apple Move to Joint Platform," *Power Mac News*, *Macworld*, January 1995). Radius's Berger sees the Mac clone makers quickly moving to the converged platform when it becomes available.

Power Computing, 408/526-0500; Radius, 408/434-1010.—GALEN GRUMAN AND CHARLES PILLER

Apple Speeds Up Power Mac Line

Apple Computer has replaced the Power Macintosh 6100/60, 7100/66, 8100/80, and their AV variants with faster models. The current models are now the 6100/66, 7100/80, and 8100/100. (The number after the slash indicates the Mac's CPU speed in megahertz.)

Although Apple has increased the speed of its Power Macs, it has not increased their estimated prices; according to Apple, a base-model 6100/66 will cost the same as a base-model 6100/60. Apple estimates that a base-model 6100/66 will cost $1819; a base-model 7100/80, $2899; and a base-model 8100/100, $3699.

The Power Macs will be available in several configurations. The base-model 6100 will ship with 8MB of RAM, built-in video circuitry, a 350MB hard drive, an Apple mouse, and System 7.5. The base-model 7100 will have 8MB of RAM and a 500MB hard drive. The base-model 8100 will include a 700MB hard drive. For the first time, a 256K cache card will be standard on the 6100 and 7100; the 8100 will continue to have the cache card. Options include more RAM, an AV card, a larger cache card for the 8100, and a CD-ROM drive. Apple also will sell a $2500 6100 system with a PC coprocessor card (see *Power Mac News*, January 1995).

continues

Apple Won't Fix NuBus Flaws

EYES ON THE PCI PRIZE

Apple recently confirmed that one reason the Power Mac 8100/80 has fewer problems with high-performance NuBus cards than other Power Mac models is due to that Mac's bus speed. (All Power Macs but the 8100/110 have flawed controller circuitry and ROMs that can reduce the effective speed to less than that of the highest-end Quadras; see "Video Hits Roadblocks," *Power Mac News*, *Macworld*, September 1994.)

The NuBus bus runs at 20MHz, for which the 8100/80's 40MHz system bus speed is an even multiple. Other Power Macs' system bus speeds are not even multiples of NuBus's 20MHz, and this causes synchronization problems that affect high-speed NuBus performance. (The Power Mac 7100/66 and 6100/66 use a 33MHz bus, the 6100/60 a 30MHz bus, the 8100/100 a 33.3MHz bus, and the 8100/110 a 36.7MHz bus.) According to Jim Gable, Apple's Power Macintosh product-line manager, the new 7100/80 should work better with high-performance NuBus cards than did the old 7100/66, since the 7100/ 80 also has a 40MHz bus. However, the 8100/100 and 8100/110 may have problems with some NuBus cards that the 8100/80 did not.

Because Apple is about to replace NuBus with the Peripheral Component Interconnect (PCI) bus, no fixes are planned for the current Power Macs, Gable says.

—GALEN GRUMAN

In Brief

Apple Drops AV Quadras

Both the Quadra 840AV and the 660AV have been removed from Apple's price list, leaving only two Quadra models, the Quadra 950 and Quadra 630, still shipping in Apple's 68040-based desktop line.

More DayStar Power Mac Cards

DayStar plans to ship several Power Mac accelerators in January 1995: a $2199, 100MHz PowerPro (for most Quadras); a $1499, 75MHz PowerPro (for the Centris 650 and Quadra 610); and an $1199, 66MHz PowerCard 601 (for the IIci). DayStar expects the PowerCard's price to drop after initial demand has been satisfied. Also, several mail-order companies have been charging $679 to $749 for DayStar's PowerCard 601 accelerator for the Quadra 630 and 605, LC 475 and 575, and Performa 630—not DayStar's original $599 estimate. 404/967-2077.

Low-Cost Dye-Sub

NEC has announced the SuperScript Color 3000M, a combination thermal-transfer–and–dye-sublimation color printer. Print speeds vary from 1 ppm in thermal-transfer mode to 1 page every 10 minutes in dye-sub and variable-dot modes. The QuickDraw printer comes with color-matching software. The $995 printer should be available in February 1995. 708/860-9500.

Portable 100MB Removable Drive

Iomega has announced the Zip drive, a portable drive that accepts 100MB or 25MB removable cartridges. The 3-by-5-inch drive may have a street price as low as $200, the company said, with the 100MB cartridges going for $19.95 each and the 25MB cartridges going for $9.95. The drive and cartridges are expected to ship in the first quarter of 1995. 801/778-1000.

Two 8100 Speeds

The arrival of the Power Mac 8100/100 does not affect the availability or $6379 price of the 8100/110 introduced in November 1994 (see *News*, January 1995). Apple expects to continue selling the 110MHz version to multimedia authors, motion-video editors, and prepress users who want both the fastest possible Macintosh and compatibility with NuBus. The 8100/110 fixes the Mac's ROM and NuBus control circuitry, which used to slow data throughput to sub-Quadra levels. The new Power Macintosh 6100/66, 7100/80, and 8100/100 continue to use the flawed NuBus circuitry.

KEVIN CANDLAND

The latest Power Mac 7100 runs at 80MHz.

The new Power Macs also do not use the smaller variant of the PowerPC 601 CPU that the 8100/110 does. The 8100/110 uses circuits that are 0.5 microns wide (a micron is a millionth of a meter), while the other Power Macs use 0.65-micron-wide circuits. IBM Microelectronics cannot produce enough of the 0.5-micron-circuit CPUs to assure Apple of sufficient supply for general Power Mac use, and the benefits of the 0.5-micron CPU—faster speed with reduced heat buildup and power consumption—aren't critical for the current Power Macs' design, since their motherboards can handle 0.65-micron-circuit CPUs at speeds up to 100MHz. Like the 8100/110, the 8100/100 uses a clock-tripled PowerPC chip, which means the bus runs at 33.3MHz. For that reason, some operations, such as communications with high-speed NuBus cards, will not run as fast as on an 8100/80, which has a 40MHz bus.

Replacement Boards, Performas Not Boosted

Apple says it has no plans to speed up its PowerPC-based Performa 6100 series or its Power Mac motherboard replacements to match the speed of the new Power Mac systems. Apple now lets dealers replace the motherboard in some older Macs with a Power Mac motherboard. For example, you can replace the motherboard in a IIvx, Centris 650, or Quadra 650 with a Power Mac 7100/66 motherboard for about $1500. Because Apple is not changing the speed of these replacement motherboards, a IIvx owner, for example, will not be able to upgrade the IIvx to a Power Mac 7100/80.

—GALEN GRUMAN

In-house Internet Servers

ACCESS TO THE INFOBAHN

Connecting your company to the Internet still isn't a task for the faint of heart, but Global Village Communication, BBN Internet Services, and InterCon are working to ease companies onto the world's largest network.

Global Village's OneWorld Internet provides E-mail and dial-up Internet access to small and medium-size businesses over their existing LANs. The OneWorld server uses a 28.8-Kbps or ISDN modem connected to a company's QuickMail or Microsoft Mail server that in turn connects via phone line to Global Village's GlobalCenter, which provides the Internet connection. The package also includes server software, MacTCP, and a World Wide Web (WWW) browser.

At setup, a OneWorld administrator can choose a domain name (so that users can receive E-mail sent to user@companyname.com); Global Village and the InterNIC (the Internet Network Information Center) automatically check the chosen name. When GlobalCenter receives E-mail, it automatically calls the OneWorld server once and hangs up, prompting the server to call GlobalCenter toll-free to retrieve the mail. Global Village says that not allowing incoming calls to OneWorld increases security. The OneWorld administrator can control the frequency at which the server connects to GlobalCenter; the amount of Internet access each user can have; and the ability to send urgent mail immediately.

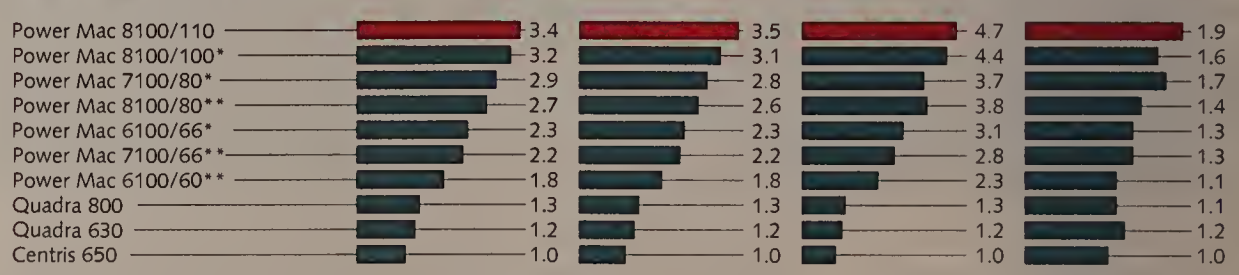
With MacTCP installed, OneWorld users can run Internet client applications, such as the popular Fetch, TurboGopher, and Mosaic clients, as well as the included Global Village Web browser.

The 28.8-Kbps QuickMail version of the server should ship by the time you read this; the ISDN and Microsoft Mail versions will follow. Global Village has not decided if it will offer a OneWorld product for Lotus's cc:Mail and has no plans to offer a PowerTalk product. The company says it will

MW LAB

How the New Power Macs Stack Up

= Best result in test. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Longer bars are better. Products are in decreasing order of overall performance.



**Prerelease unit; performance of shipping unit may vary slightly. **System discontinued by Apple; however, motherboard replacements will still convert selected Macs into these Power Mac systems.*

BEHIND OUR TESTS

Macworld Lab tested several functions in eight key programs plus the Finder to determine real-world performance for the three critical performance areas faced by most users: basic processing ability (the CPU-Intensive score), math processing ability for specialized applications like modeling and data analysis (FPU-Intensive score), and hard drive performance (the Disk-Intensive score).

We then averaged the results, giving the CPU-intensive score 60 percent of the weight, to derive the overall performance, which gives an accurate measure for most business users of their Mac's performance. These results are not comparable with previous Macworld Lab benchmarks.

We tested native versions of software on the Power Macs and 680X0 versions on the 040 Macs. The software included System 7.5; Adobe Illustrator 5.5, PageMaker 5.0a, Photoshop 3.0, and Premiere 4.0; Fractal Design Painter 2.0; Microsoft Excel 5.0; Specular International Infini-D 2.6; and Wolfram Research Mathematica 2.3. Our 680X0 Macs had 16MB of RAM, while the Power Macs had 24MB. All systems were run with 8-bit color on 17-inch monitors.—**Macworld Lab testing supervised by Danny Lee and Mark Hurlow**

release a more fully featured Web browser in the future. The company expects the server to cost $1500 to $2000 and monthly fees to be less than $100 for small LANs with light Internet use. Hourly connection fees should be between $6 and $10 per hour.

For larger companies with heavier usage needs, BBN Internet Services offers the Internet Server, a turnkey Unix server that can be managed from a Mac or a Windows PC. The Internet Server provides incoming and outgoing E-mail, newsgroups, WWW, Gopher, and FTP. The standard system lists for $9895 and includes a Pentium-based Unix PC with 16MB of RAM, a 500MB hard drive, an Ethernet card, and a tape drive. BBN also offers Internet connections, or the company will work with customers and their Internet-service providers to configure a new server. For $1450 per year, users can buy a contract that includes server-software updates plus round-the-clock support. Purchasers must supply their own client software.

Providing another in-house Internet option, Inter-Con Systems recently agreed to distribute Pipeline, a client-server Internet-connection package that emphasizes ease of use for the end user (see "A New Mac Pipeline to the Internet," *News*, October 1994). The latest version of Pipeline, expected to be available by the time you read this, provides full incoming and outgoing Internet-access services, including E-mail, WWW, Gopher, and FTP. The package requires a Unix server; clients are available for Macs and Windows machines, with OS/2 in the works. The annual server license lists for $7500 plus $50 per user; Inter-Con will customize the front end and provide assistance with server setup. Quantity discounts are available. Global Village Communication, 408/523-1000; BBN Internet Services, 617/873-8730; Inter-Con, 703/709-5500.—CAMERON CROTTY AND JOANNA PEARLSTEIN

DOUG ROSS

Piracy Ring on America Online

MILLIONS OF DOLLARS LOST?

Most of the 1.25 million members of America Online are good, law-abiding citizens. Several dozen, however, are apparently using the information service's generous starter kits and anonymity features to run a commercial-software piracy ring.

The group calls itself MinMax, short for minimum effort, maximum gain. A member of this ring begins by signing on to AOL using a free ten-hour starter-kit disk.

When signing on, the ring members provide phony names, addresses, and credit card numbers. Because a genuine card number can be initially verified through a mathematical test, the pirates use a small application to generate numbers that pass the verification test.

Once online, the "new member" mails commercial programs to himself or herself.

The ring members then trade with one another by simply forwarding their own E-mail messages. No re-uploading is necessary. The list of pirated programs includes over 200 items, such as Adobe fonts, Word 5.1 and 6.0, Macromind Director, ElectricImage, System 7.5, PageMaker, games, and the Holy Bible. To protect their E-mail from possible surveillance by America Online administrators, many of the pirates use an encryption program to encode their messages.

An AOL spokesperson said that AOL could act only on solid proof, and that the messages do not constitute such proof.—DAVID POGUE

BUGS & TURKEYS

Adobe Photoshop 3.0.1's gamma control panel doesn't work with the Power Macintosh Upgrade Card. Adobe hopes to provide a fix soon. In the meantime, users can (1) open both the Monitor and gamma control panels, (2) change colors to 256 or thousands, (3) adjust the gamma control panel, (4) reset the colors to the desired level, and (5) close both control panels. Oh—do this every time you restart your Mac.

Although made by the same company, STF's Faxstf 3.0 crashes if Powerfax Gateway for System 7.5 is installed—despite what the Powerfax Gateway manual says. Users who purchased STF's AutoPack OCR software can get the update free; those who didn't will have to pay $39 for the Faxstf 3.1 upgrade, which includes the OCR portion. In both cases the upgrade is available only by calling STF Technologies at 816/463-7972.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld*.

In Brief

Apple Mobile Message System

Apple has put together the Apple Mobile Message System, an all-in-one-box wireless messaging system that works with Newtons and PowerBooks or any Mac or Windows PC with a PCMCIA slot.

The bundle's PCMCIA card is from Socket Communications, the software is from Ex Machina, the wireless communications service is PageNet, and an unnamed company will provide support. The Apple bundle's software can plug data into Aldus DateBook and TouchBase. It should cost $450 and have a monthly basic service fee of around $20. 408/996-1010.

StyleScript for LaserWriter 2400

Version 1.1 of GDT Softworks' StyleScript software provides true Adobe PostScript Level 2 configured to work with Apple's Color StyleWriter Pro and the more recent Color StyleWriter 2400. The software works with all Type 1 and TrueType fonts, and ships with 13 PostScript fonts. It lists for $149 and requires at least 8MB of RAM, at least 5MB of free disk space, and System 7 or later. 604/473-3616.

Mini-CD Data Drives

Sony has announced its first MD (Mini Disc) data drives. The $699.95 MDH-10 is a battery-powered portable offering 140MB of storage with data-transfer rates equal to those of first-generation CD-ROM drives (150 Kbps). The drives work with any computer using a SCSI interface, and Sony bundles drivers and formatters for Macintosh, MS-DOS, and Windows. The drives can be powered by a $50 rechargeable lithium-ion battery pack, three AA alkaline batteries, or an AC power adapter. Apple is rumored to be considering using the MD drives in a future PowerBook. Sony, 800/352-7669.

Anderson & Lembke, Inc.

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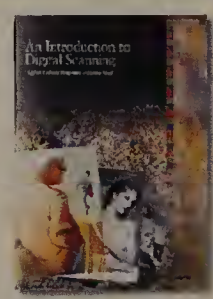
With all the praise the Arcus family has won, you'd think we'd rest on our laurels. Think again. The Agfa Arcus II is a completely new, 600 x 1200 ppi, 36-bit color scanner with an integrated transparency module. It's also designed to be the best machine you can put on your desktop.



Compared to other "desktop" scanners, the new Arcus II can capture more highlights and shadows, thanks to its 3.0 dynamic range. That's the kind of image quality you used to have to send out for. Plus, no other top-of-the-line "desktop" scanner comes with Agfa FotoLook scanning software, Agfa FotoTune color management software, and full Adobe Photoshop™ software built in.

And no one else can offer you our new, 42-page *Introduction to Digital Scanning*, which takes you step by step through a variety of scanning situations.

Truth is, with everything we added to the Arcus II, we're expecting some more awards. But the real prize winner will still be you. Call 1-800-685-4271 to find out more information on Agfa's new scanners.

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Circle 43 on reader service card

Power Mac News

Apple/IBM Effort to Replace Mac

MAC LINE WILL NOT BE SPLIT

The current Power Mac hardware platform will eventually be phased out in favor of the new platform standard being developed jointly with IBM and Motorola, according to Jim Gable, Power Macintosh product line manager at Apple Computer. "We plan to merge [the current Power Mac platform into the new specification], though it won't happen overnight," he says.

Gable predicts that the new platform will spawn midrange to high-end machines initially, but will eventually absorb the whole Macintosh product line. He suggests that the first common-platform–based Macintoshes will probably hold the greatest appeal for large businesses that want to take advantage of the ability to run multiple operating systems from a single computer in cross-platform computing environments.

The common-platform specification will be published this spring, after major peripherals developers and system licensees have had a chance to comment on the current draft, Gable says. Those developers want assurance that their own development work will be fast and straightforward on the new platform. "It'll be like building your own PC today—you pick the processor, the storage, the video subsystems you want, networking systems, and the OS," Gable says. "It is highly modular, partly because it's based on PCI," the Peripheral Component Interconnect bus that Apple will replace NuBus with in the next-generation Power Macintoshes, due this spring.

Gary Griffiths, director of business development for IBM Power Personal Systems, says that products based on the converged platform should emerge sooner than some analysts have been predicting; Griffiths expects to see machines on the market by late 1995. But computers that run the Macintosh Operating System—one of the most difficult systems to port to the new platform—would probably not be available until several months later. Apple's Gable says he expects no converged-platform Macintoshes from Apple until late 1996, but separately licensed

Mac-only clones will appear earlier (see *News* elsewhere in this issue).

It is likely that the converged-platform computers will have a slot to accept a Mac ROM, so users can add the Macintosh Operating System (for the same price as Windows, Gable says) later to systems that didn't ship with it.—CHARLES PILLER

Software's Third Wave

RISE IN NATIVE POWER MAC SOFTWARE

First came the early adopters, who shipped native Power Mac software on the heels of the March 1994 release of the first Power Macs. Aimed largely at relatively small groups of users who most needed the Power Mac punch, such as people who work with CAD, these programs were often developed with prerelease programming tools, since Apple was slow in readying such tools. Then came the wave of software in late summer that was aimed at the broader market, everything from publishing to disk recovery. And in late fall 1994 came the third wave: programs from a broad assortment of companies preparing for announcements during the crucial Christmas season and the January Macworld Expo. Here's an alphabetical list of companies that expect to ship their products by the time you read this.

- CAChe Scientific's WorkSystem, a $29,990 system for molecular modeling. It is not available for 680X0-based Macintoshes. 503/531-1800.
- Common Knowledge's Arrange 2.0, a $349 personal information manager. 415/325-9900.
- Deneba Software's Canvas 3.5, a $399 illustration program. 305/596-5644.
- Inspiration Software's Inspiration 4.1, a $129 idea developer. 503/245-9011.
- Language Systems Corporation's LS Object Pascal, a $399 compiler. 703/478-0181.
- Macromedia's Director 4.0, a $1195 multimedia authoring tool. 415/252-2000.
- Microspot USA's PhotoFix, a $249 image editor. 408/253-2000.
- Multi-Ad Services' Multi-Ad Creator, a $995 ad-layout tool. 309/692-1530.
- National Instruments' LabVIEW 3.1, a $1995 instrumentation program. The $2395 LabSuite package also includes the native version of the HiQ mathematical-analysis software. 512/794-0100.
- Npath Software's $299 Tableworks Plus 2.0, a table-creation plug-in for QuarkXPress. 206/392-7745.
- SAS Institute's JMP 3.1, a $695 statistical-analysis tool. 919/677-8000.
- SoftArc's FirstClass 2.6, a BBS and electronic-conferencing system. Prices vary based on configuration. 905/415-7000.
- Thursby Software Systems' TSSnet 2.6.1, a $295 connectivity and terminal-emulation program for DECnet networks. 817/478-5070.
- Vamp's $1095 McCAD Tracker 3.2, a circuit-board design program. 213/466-5533.
- WaveMetrics' Igor Pro, a $15 data-analysis package upgrade. 503/620-3001.
- Xerox Corporation's TextBridge 2.0, a $99 OCR program. 415/813-6800.

—GALEN GRUMAN

ILLUSTRATIONS BY JOHN BLECK

There's the one

where you're suddenly standing onstage

at the senior prom wearing only really

big underwear and a fez.

And everyone is laughing hysterically,

including Mr. Dimnitz,

your guidance counselor.

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where your computer's

hard drive fries 30 minutes before the big

presentation, and you've

lost everything.

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New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY *MACWORLD*. UNLESS OTHERWISE STATED, THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS WITH 1MB OF RAM, RUNNING SYSTEM 6. A ◀ SIGNIFIES THAT A NATIVE POWER MAC VERSION OF THE PRODUCT IS AVAILABLE. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY *MACWORLD*. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

APS D 1.0 and 2.0

Doesn't it feel great to say, "I'll just throw that data on my gig drive"? These two SCSI drives are available in both internal (for the Quadra 605, 610, 800, and 950) and external versions. Both the 1GB D 1.0 and the 2GB D 2.0 have an average access time of 17ms and sustained data-transfer rates of over 3 MBps. D 1.0 internal $699.95, external $799.95; D 2.0 internal $1199.95, external $1299.95. APS Technologies, 816/373-5800, 800/235-2753; fax 816/483-3077.

ArtPad ADB

ArtPad ADB

This ADB input device can serve either as your graphics tablet or simply as an alternative to your mouse or trackball. The Wacom Technology ArtPad comes with a cordless pen that provides 256 levels of pressure sensitivity; the pen sports a side button that you can map to different keys or functions with the included software. $199. Wacom Technology, 206/750-8882, 800/922-6613; fax 206/750-8924.

CCL 600ES and 1200ES

Sure, we trust our electronic documents, but they're never as satisfying as good old hard copy. The CCL 600ES is a 16-ppm, 600-by-600-dpi laser printer that can print full-bleed on pages up to 11 inches by 17 inches. The CCL 1200ES has the same engine speed and imaging area but can print 1200 by 600 dpi. Both printers come with 65 Type 1 fonts and support HP PCL5, HPGL/2, and Adobe PostScript Level 2. The 600ES ships with 8MB of memory (expandable to 40MB), while the 1200ES ships with 16MB of memory (expandable to 48MB). Both printers have simultaneously active serial, parallel, and AppleTalk interfaces, and both can accept an optionally available Ethernet interface. CCL 600ES $3550; CCL 1200ES $3995; Ethernet interface $495. CalComp, 714/821-2000, 800/932-1212; fax 714/821-2832.

CD/Maxtet 4x

You can put over 4GB of data on your network server through a single SCSI ID with this seven-drive SCSI-2 CD-ROM tower. Optical Access loads the CD/Maxtet 4x with seven quad-speed drives (600-KBps data-transfer rate). The tower includes an internal controller to help arbitrate multiple user requests and ships with the company's SuperCache CD-ROM caching and driver software. $7395. Optical Access International, 617/937-3910, 800/433-5133; fax 617/937-3950.

CDT7-Mac

Piles and piles of data are yours for the accessing when you install this tower of seven quad-speed (600-KBps) CD-ROM drives. The CDT7-Mac contains a controller card that arbitrates input and output, so the entire device takes up only one SCSI ID. The controller card also adjusts cache and page sizes in real time for each drive, to help achieve maximum performance. The drives all support Mac HFS, Audio CD, High Sierra, ISO 9660, and multisession Kodak Photo CD formats. $6500. Procom Technology, 714/852-1000, 800/800-8600; fax 714/852-1221.

DiiMOCache Quadra Cache Cards

It's not a faster CPU, but you can give your Quadra 700, 800, 900, or 950 a boost with one of these 128K PDS cache cards. The cards use fast static RAM and your Mac's internal RAM to speed up many system operations, especially screen redraw. Quadra 700 and 900, $129; Quadra 800 and 950, $199. DiiMO Systems, 512/335-0421, 800/503-4466; fax 512/335-1429.

DiiMO Slot-Free Cache Card

Satisfy your need for speed without blowing a slot on a cache card. These 128K static RAM cards plug into the processor socket on the motherboard of Quadra 610, 650, 660AV, 700, 800, 900, 950, and Centris 610 and 650 computers. A card for the LC 475 is also available, and all cards ship with control-panel software for turning the cache on and off. Prices range from $199 to $249. DiiMO Systems, 512/335-0421, 800/503-4466; fax 512/335-1429.

ELP-3000

When using this multimedia projector, you can choose screen sizes from 21 inches to 300 inches in diagonal measurement, to best fit your presentation environment. The ELP-3000 is a complete, self-contained projector with an active matrix color LCD screen that can show 640 by 480 pixels, with up to 16.7 million colors, a light source, and a lens for focusing the display. The projector automatically senses the type of video input, whether Macintosh or PC, and accepts composite (NTSC, PAL, and SECAM) video-in. $8999. Epson America, 310/782-0770, 800/289-3776; fax 310/782-4214.

ELP-3000

GCD-100S

Designed for the digital-sound enthusiast or professional, this double-speed (300-KBps) SCSI CD-ROM drive features an S/PDIF digital output for transferring digital audio to digital inputs on samplers and digital audio workstations. The drive can also pipe digital audio from a CD directly into your Macintosh via the SCSI bus, using the included Direct Sample software. The drive supports audio CD, Mac HFS, MPC-2, ISO 9660, High Sierra, CD-ROM XA, and Kodak Photo CD (multisession) formats. A rack-mount model (GCD-100R) is also available. GCD-100S $395; GCD-100R $495. Glyph Technologies, 607/275-0345, 800/335-0345; fax 607/275-9464.

Graphx Z

Helping to make sure that your audience gets the point, this active matrix color LCD projection panel can display up to 1.4 million colors at 1024-by-768-pixel resolution. Compatible with Macs with older, Mac II–style video output and with the newer VGA output, the Graphx Z automatically senses the type of video input and configures itself for proper display. The panel weighs 5 pounds and comes with a hard-shell carrying case. $13,995. nView Corp., 804/873-1354, 800/736-8439; fax 804/873-2153.

Graphx Z

Hammer PE 350 and 700

Sporting a Fast SCSI-2 interface, these hard drives both have a sustained data-transfer rate of 2.6 MBps. As their names imply, the Hammer PE 350 and PE 700 can hold 350MB and 700MB of data, respectively. Both drives ship with FWB's Hard Disk ToolKit Personal Edition disk-management software for updating, formatting, partitioning, and testing SCSI drives. PE 350 internal $379, external $469; PE 700 internal $549, external $639. FWB, 415/474-8055; fax 415/775-2125.

HR 6000

You can create slides and prints from your desktop with this SCSI slide printer. The HR 6000 can produce slides with 4000 lines of resolution from 24-bit color

continues

HR 6000

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images, and supports 35mm film backs (included), 3¼-by-2¼-inch, 4-by-3-inch AutoFilm, and 4-by-5-inch film formats. The Macintosh Interface Kit (required, but sold separately) includes the Digital Palette Chooser driver. $5995; Macintosh Interface Kit $499. Polaroid Corp., 617/386-2000, 800/816- 2611, ext. 9; fax 617/386-9339.

LANForce-5
Afraid your data might get dumped? Don't get down, get fault-tolerant. The LANForce-5 is a seven-drive SCSI array that supports RAID 0, 3, and 5. With RAID 5 active, you can hot-swap a failed drive, and the array rebuilds the data without interrupting user access. For further insurance, the unit also has redundant, hot-swappable power supplies. Prices range from $11,995 to $54,695, depending on configuration. Procom Technology, 714/852-1000, 800/800-8600; fax 714/852-1221.

Master CD
With this CD-recording drive, you can cut your own discs for backup, distribution, or other purposes. The Master CD is a SCSI device; it supports Macintosh HFS, CD-ROM XA, ISO 9660, Mixed Mode, and CD Audio formats, and ships with mastering software. $2495. Micro-Net Technology, 714/453-6000; fax 714/453-6001.

MBR-7
This SCSI-2 CD-ROM drive puts up to 4.7GB of data on your desktop. The MBR-7 uses a single, double-speed (300-KBps data-transfer rate) drive and a magazine of seven disks. The drive can switch between adjacent disks in 2.5 seconds. The drive supports the ISO 9660, Mac HFS, CD Audio, CD-ROM XA, and Kodak multisession Photo CD formats. $649. Nakamichi Peripherals, 714/373-9989; fax 714/373-9979.

MR/20
For the few who really need 84GB of online storage (and you know who you are), we mention this 20-drive RAID array. The MR/20 has a SCSI-2 Fast and Wide interface, comes fully loaded with 4.2GB drives, and supports RAID levels 0, 3, and 5. The array can achieve sustained data-transfer rates of 15 MBps; has dual redundant hot-swappable power supplies and fans; and can be equipped with a variety of options, including up to 128MB of on-board cache memory, a tape-backup module, and a pager-notification module. $20,200. MegaDrive Systems, 310/247-0006, 800/322-4744; fax 310/247-8118.

TechJet Color
Talk about seeing the big picture—the TechJet Color plotter is available in both D-size (Model 5324) and E-size (Model 5336), producing prints on cut-sheet media up to 24 inches and 36 inches wide, respectively. The two models can also produce plots up to 50 feet long on D- and E-size roll-feed media, respectively. Both plotters print 360 by 360 dpi in color and 720 by 720 dpi in black and white. Both models support CALS G4, HPGL, HPGL/2, and HP-RTL data formats and come with parallel and serial interfaces. Macintosh users will need to purchase a separate connection kit from CalComp. D-size $5595; E-size $6595. CalComp, 714/821-2000, 800/932-1212; fax 714/821-2832.

ViewMagic Touch Screens
Equipped with a resistive touch panel, mouse driver, controller, and cables, this line of touch-screen monitors ranges from 10 inches to 17 inches in diagonal measurement. The touch panels provide 1024-by-1024-point resolution and read touches at up to 200 points per second. VM-10T $999; VM-14T $849; VM-15T $949; VM-17T $1749. ETC Computer, 510/226-6250; fax 510/226-6252.

ViewSonic 21PS

ViewSonic 21PS
This 21-inch color display features a 0.25mm dot pitch, and produces resolutions up to 1600 by 1280 pixels at a 72Hz vertical refresh rate. The 21PS features an on-screen control system for adjusting image brightness, contrast, size, and positioning. Users can also fine-tune color temperature and intensity. The monitor complies with the Energy Star standards and meets the Swedish MPR II guidelines. $1995. ViewSonic, 909/869-7976, 800/888-8583; fax 909/869-7958.

SOFTWARE

Absolute Zero
You know you're having a bad day in the year 2374 A.D. when the surface of Jupiter's moon Europa erupts with hostile aliens, instantly killing a third of the miners in your colony. In this space-war simulator, you can choose to fight on the side of the colonists or the aliens, piloting one of 12 different vehicles in a battle to the finish. 5MB min. memory; requires Power Macintosh, System 7, 8-bit color. $49.95. Domark Software, 415/513-8929; fax 415/571-0437.

Absolute Zero

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compresses them; transmits them via LAN, dial-up connection, or WAN; and decompresses them at the destination. Users can add comments to files they send, and the software keeps a log of all transactions. One receiver and unlimited sender clients $695. MicroBeam, 813/546-2727; fax 813/541-3278.

BreakThru
This Tetris-style arcade game invites you to indulge your destructive urges and tear down the wall. Players are required to raze a wall, brick by brick, in a set time limit. By clicking on a brick, the player eliminates it, along with any other bricks of like color that it is touching. To make matters more interesting, additional bricks occasionally drop from the sky onto the wall. Users can play alone or simultaneously with a friend in split-screen mode. $44.95. Spectrum HoloByte, 510/522-3584, 800/695-4263; fax 510/522-3587.

C.A.Facilitator
At once the bane and heart's blood of business, meetings always beg for improvement. C.A.Facilitator is a software support package that provides tools for better meetings. With C.A.Facilitator, the conference moderator plans and structures the meeting, and then the software provides an open forum over a network, where participants can share thoughts and ideas—anonymously if so desired. Meeting participants can put ideas up for a vote, create lists of action items, and print out the complete notes from a meeting. All meeting information is also stored and cross-referenced in C.A.Facilitator's IdeaBase relational database. Server requires 25MHz 68030, 6MB min. memory, System 7.1; client requires 16MHz 68030, 2.5MB min. memory, System 7.1, 640-by-400-pixel display. Three concurrent users on a single server $2995, each additional concurrent user $1000. McCall, Szerdy & Associates, 805/682-6939, 800/423-8890; fax 805/682-6279.

Just Dingbats, Volumes 3 and 4
These volumes of clip art are contained in fonts, making it possible for you to liven up your documents without dealing with importing images. Volume 3, Holiday Symbols, has 101 images of traditional American holidays and special occasions, from Christmas to Saint Patrick's Day to Martin Luther King, Jr., Day. Volume 4, American Politics, contains 115 images, including banners, hats, flags, political party symbols, and caricatures of American presidents. $69.95 per volume. The Communications Shop, 716/473-1650, 800/733-1650; fax 716/473-5201.

Loony Labyrinth
Light 'em up, ball jockey. The maker of Tristan and Eight Ball Deluxe is back with yet another simulated Mac game table. While you pursue the elusive Loony Stone, you have to deal with a maze, three flippers, 3-D ramps, and multiball play. 4MB min. memory; requires 13-inch monitor, 8-bit color. $59.95. StarPlay, 303/447-9562, 800/203-2503; fax 303/447-2739.

Loony Labyrinth

MLAB
If you're in the market for a program that can create models of dynamic mathematical and statistical systems, then this package might do the trick. MLAB can handle curve-fitting and differential equations, and has over 400 statistical and mathematical functions. The software includes a programming language, with facilities for branching and looping. 3.5MB min. memory; requires Mac II with math coprocessor. $1495. Civilized Software, 301/652-4714, 800/672-6522; fax 301/656-1069.

MPower
Creating a static slide-show presentation isn't a problem, but easily adding audio and video can be. Within MPower, users can create traditional presentations with backgrounds, text, graphics, and animation, and along the way add multimedia elements with help from the software. With the appropriate hardware, MPower can control external audio and video devices and can digitize signals from those sources. Users can also add buttons to create interactive presentations. 6MB min. memory; requires 640-by-480-pixel color monitor, System 7. $295. Multimedia Design Corp., 704/523-9493; fax 704/523-9938.

MPower

On Guard
Don't leave your Macintosh unprotected—this software adds security features directly to the Finder. Administrators can prevent unauthorized users from renaming, moving, copying, altering, or deleting files and folders. The software also protects the Macintosh from deliberate invasion: On Guard prevents users from bypassing the extension by holding down the shift key and disables the programmer's key and the system-control

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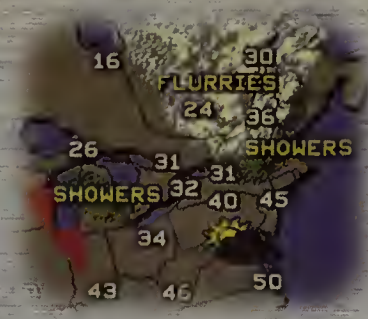

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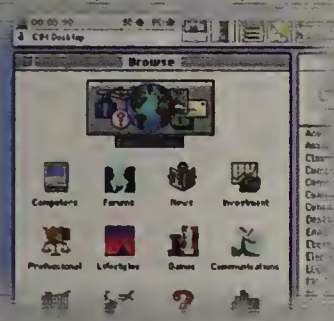

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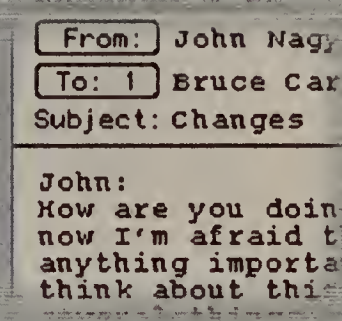

E-mail.

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Gardening Forum.

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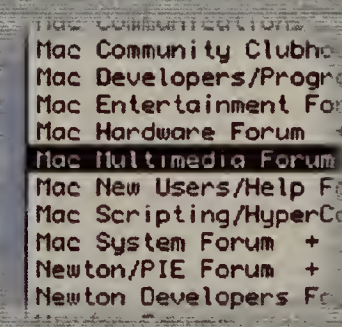
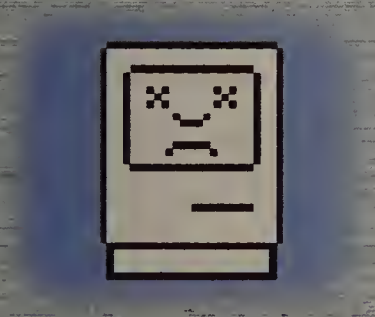
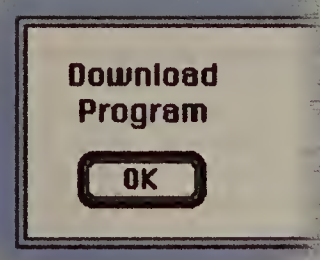


Over 20 Mac forums.

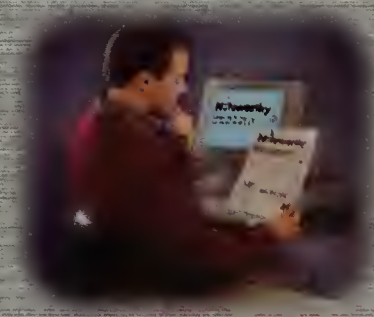


Virus updates.

Science Fiction and Fantasy Forum.



Downloadable programs.



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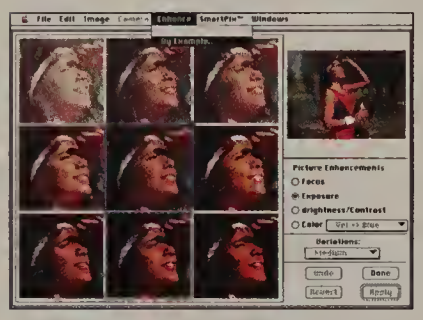

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CD-ROMS

Paper Planes
With this disc spinning in your Macintosh, you can build complex models with heavily researched flight dynamics—out of paper. There's a large assortment of dart, glider, and stunt planes to choose from, and animations walk users through each step of construction. There's a full glossary of flying and folding terminology, and each plane's instructions include an animated preview of the projected flight path. 2.5MB min. memory; requires Color Classic, System 7, double-speed CD-ROM drive. $29.95. WordPerfect Corp., 801/225-5000, 800/451-5151; no fax.

Rand McNally Children's Atlas of the United States
What fun is memorizing lists of states and their capitals by rote? This atlas teaches kids about every state in the union, their geography, history, local industries, statistics, and points of interest. The disc includes over 200 digitized pictures, 6 games designed to encourage kids to use the atlas as a reference, and music from different parts of the country. Also, younger kids can click and have all of the atlas's text read aloud to them. $59.99. Gametek, 305/935-3995, 800/426-3835; fax 305/932-8651.

Understanding Exposure

Understanding Exposure
Do you know the difference between an f-stop and an ASA rating? Are you sure? This software walks users through a series of lessons teaching them how to get better results out of their single-lens reflex (SLR) cameras. The disc includes a virtual photo lab, where you can experiment with aperture, exposure, and film speed, and see how your choices would affect an actual photograph. 4MB min. memory; requires 8-bit color. $79.95. Diamar Interactive, 206/340-5975, 800/234-2627; fax 206/340-1432.

ACCESSORIES

C/DAS Kit
It's a sad thought but, wherever you go, chances are that someone is eyeing your PowerBook with fiendish intent. This self-contained, portable alarm system can help make sure that your PowerBook stays yours. A sensor attaches to your PowerBook with a nonmarking adhesive. The sensor plugs into a Control Module, via connector cables. Once the system is activated, any attempt to cut or unplug the cables, remove or tamper with the sensor, or tamper with the Control Module sets off a 110-dB alarm. The Control Module can be bolted in place for a permanent installation, or the cables can be looped around an immobile fixture for on-the-road security. $329.95. Rokan Corp., 404/740-1616, 800/228-5625; fax 404/740-1520.

TC1490
Give your presentations, musical creations, or (gasp!) games that extra sonic thump with an external amplifier. This 80-watt amp has volume and balance controls, a graphic equalizer, and a variable blend control for external microphones. Both speaker and line-level outputs are included. Requires external speakers. $199.95. Micro Multimedia Labs, 410/998-9580; fax 410/998-9617.

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TrackBoard
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VST Auto Adapter 500
Pulling power from your PowerBook batteries when you're in a car and thus have a perfectly good power supply available is irritating. With the Auto Adapter 500, you can plug into a standard cigarette lighter for DC power. $99.95. VST Power Systems, 508/287-4600; fax 508/287-4068.

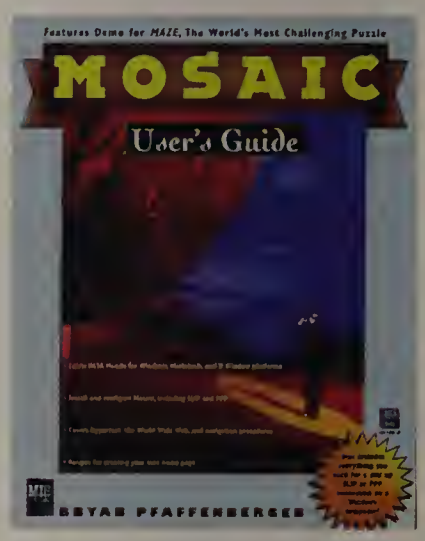
VST Charger 500
You can reduce your traveling downtime with this charger for PowerBook 500–style batteries. The VST Charger 500 can charge or condition two batteries at once in about an hour. The charger ships with Emmpathy software that helps maintain the Energy Monitor Module within the PowerBook 500 smart batteries. $179.95. VST Power Systems, 508/287-4600; fax 508/287-4068.

BOOKS

Macintosh System 7.5 For Dummies
Fear not even the most recent upgrade as author Bob LeVitus walks you through Apple's latest version of the Mac Operating System. This book covers everything from the most basic features of System 7.5 up through the fancy add-ons, including PowerTalk, QuickDraw GX, and AppleScript. Readers will discover tips and tricks on getting the most out of their machine. 408 pages. $19.95. IDG Books Worldwide, 415/358-1250, 800/762-2974; fax 415/358-1260.

Microsoft Excel Visual Basic for Applications Step by Step
Learn to use the built-in programming language in Microsoft Excel version 5 with this self-paced training package. Readers tour Excel's macro capabilities, learn how to automatically format data, learn to work with Excel objects, create a custom user interface, and build a data-extraction utility. Each lesson is illustrated with real-world examples and integrated with practice files on the accompanying disk. 352 pages. $29.95. Microsoft Press, 206/882-8080, 800/677-7377; no fax.

Mosaic User's Guide
This volume invites the reader to explore the World Wide Web and the Internet, combining a basic tutorial with reference work. Written by Bryan Pfaffenberger, the book includes instructions for obtaining, installing, and configuring Mosaic, as well as guidance on establishing a SLIP or PPP connection. 350 pages. $24.95. MIS:Press, 212/886-9200, 800/488-5233; fax 212/633-0748.



Mosaic User's Guide

Network and Internetwork Security
The first part of this book concentrates on the principles of network security, including confidentiality, authentication, digital signatures, intruders, viruses, worms, and conventional encryption. The second part of the book describes network security practice, covering algorithms and applications that are either in widespread use or are likely to enjoy widespread use in the future. 480 pages. $55. Prentice Hall Computer Publishing, 201/592-2000, 800/947-7700; fax 515/284-2607. m

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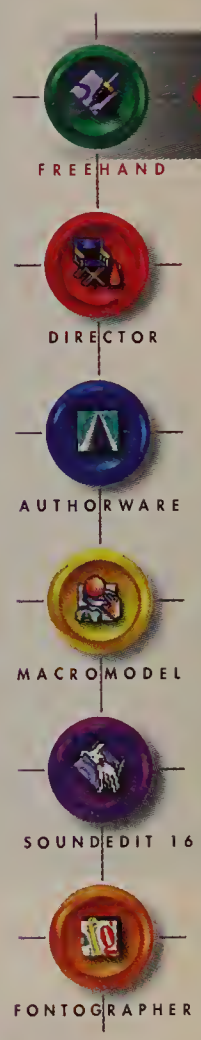

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Clark Christensen

Rochester, New York

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Used to play the tuba.

Used to use Microsoft Word.

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Reviews

Power Macintosh 8100/110

Macintosh Computer

PROS: Top-of-the-line speed; improved NuBus circuitry; wide availability of Power Mac–native software. **CONS:** Top-of-the-line price; single configuration. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** $6379.

MW ★★★

ROBERT PERRY/SCREEN IMAGE-IMAGE BANK

AIMED AT HIGH-END DESKTOP publishers, graphics/prepress users, and multimedia authors, the Power Macintosh 8100/110 holds the precarious position of being the fastest Macintosh in Apple's stable and fills a special niche in the Mac market. Call it a limited collector's edition of the 8100 family. Although Apple has increased the speed of all the original Power Mac models (and now offers a 100MHz version of the 8100), it expects the 8100/110 to appeal to those who want the fastest Mac available. And with the 8100/110, the company is correcting errors in the NuBus implementation that caused problems for some Power Mac users.

New Chip

The 8100/110 employs the 601+ PowerPC processor, a slightly improved version of the 601 chip that the other Power Macs use. The 601+ is smaller, uses less power, and runs cooler than the standard PowerPC 601 processor (see "Apple Pushes Power Mac to 110MHz," *News, Macworld*, January 1995). The 110MHz chip runs at three times the 8100/110's motherboard speed of 36.7MHz.

The 8100/110 edged out the 8100/100 by less than 10 percent in all Macworld Lab tests, and the 8100/110 beat the 8100/80 by about 20 percent. Though in some ways it's like comparing apples with oranges, any edge that the 8100/110 might claim over 90MHz Pentium machines is lower than you might expect, given the 20MHz difference in clock speed between the two chips (see "Power Mac vs. Pentium PC," *Power Mac News*, February 1995). This is particularly true for operations that involve accessing disks and peripherals that rely on the parts of System 7.5 still running under 680X0 emulation. In those instances, a Pentium computer beats the 8100/110 by a wide margin.

Fixing the NuBus Problem

One of the few mistakes Apple made in its very successful transition to the PowerPC chip was changing the NuBus implementation on the Power Macs. Apple removed certain NuBus toolbox routines from the Power Macs' ROM, and then a bug in the NuBus controller chip compounded the problem. As a result, high-end users—such as digital-video editors and multimedia authors—have found that the Power Mac's NuBus does not deliver the high-speed data transfers they require.

The 8100/110 includes some very specific fixes to the Power Mac line that desktop-video people lobbied for. Apple improved the handling of third-party NuBus video cards and RAID systems by redesigning the NuBus controller (the Bart21 chip) and correcting the NuBus routines in the 8100/110's ROM. The 8100/110 allows burst-mode data transfers, which are common with video-editing cards, and also reduces some of the bus-timing errors that can affect large data transfers across NuBus. Apple hasn't solved all the problems with the timing errors and admits that some low-level bugs remain. Users who demand the very highest NuBus performance will want to test their NuBus cards before committing to the 8100/110.

Another change that will please digital-video editors is the 8100/110's support for superslot addressing, which was designed to increase the amount of data that can move across NuBus slots. While these fixes don't speed up NuBus transfers on the Power Macintoshes, they do increase the amount of data that can travel across the bus.

All the other Power Macs—including the 6100/66, 7100/80, and 8100/100 that Apple announced in January at Macworld Expo—contain the NuBus flaws, which in some cases make NuBus performance on the Power Macs fall below that of the Quadra machines. Apple doesn't believe that most users will be affected by these bus problems, and the company doesn't plan to correct the flaws or offer trade-ins or upgrades for the original Power Macs. While this might not be a Pentium-size error, it won't please some Power Mac owners who bought their computers for high-end video work, only to find that some of the NuBus cards will not work properly with their machines.

Single Configuration

Apple offers only a single configuration of the 8100/110: 16MB of RAM (8MB soldered onto the board, with two 4MB SIMMs preinstalled), expandable to 264MB; a 2GB hard drive; and a double-speed CD-ROM drive. The 8100/110 also ships with a 256K cache card (which Apple is now including in all Power Macs); this increases the 8100/110's built-in cache to 512K. The 8100/110 ships with the same PDS video card that the 8100/80 uses, with 2MB of video RAM soldered onto the board. That standard configuration supports 16-bit color on 21-inch displays and 24-bit color on 17-inch or smaller displays. If you upgrade the video RAM to the maximum 4MB (about $200), you get 24-bit color on displays measuring up to 21 inches.

With few exceptions, the 8100/110 has the same features as the 8100/80: standard Ethernet, three NuBus expansion slots, and a dual-channel SCSI setup. The two SCSI ports increase the number of SCSI devices you can add to the 8100/110, which can use the SCSI-2 Fast internal channel for high-speed data transfers and the external channel for up to six SCSI peripherals that don't require such fast transfers. This means that slower devices in the SCSI chain won't affect the performance of SCSI devices (like RAID systems) on the faster channel, because those slower devices can use the second channel.

Unlike previous Power Macs, which can use System 7.1.2 or later and don't need an enabler, the 8100/110 requires System 7.5 and an enabler. Another change is that Apple won't be offering an AV version of the 8100/110. This is not surprising, however, as most desktop-video professionals want and need more-powerful video solutions than they can get with Apple's AV PDS cards for the Power Macs.

The 8100/110's tower case provides a great deal of expansion flexibility. In addition to the 2GB third-height 3½-inch hard drive and 3½-inch floppy drive, the tower case has room for another full-height 3½-inch drive (or two half-height drives) and has a 5¼-inch removable-media bay that houses the included CD-ROM player. The single configuration may not completely satisfy the 8100/110's target audience, who tend to demand custom configurations for their machines. Many users may end up taking out the 2GB hard drive or the CD-ROM player to configure the 8100/110 with a larger hard drive, a RAID system, or a SyQuest or optical drive.

The Second Wave: PCI

If you are thinking about buying an 8100/110, you ought to consider the looming PCI (Peripheral Component Interconnect) expansion-bus standard, tentatively scheduled for inclusion in all new Power Macs due to ship in the first half of 1995. Apple conservatively estimates that the first generation of PCI slots in the Power Macs will be twice as fast as NuBus. With that bandwidth, digital-video professionals will be able to capture and play back video at a much higher data rate, getting QuickTime video-transfer rates of 10 to 12 megabytes per second. The PCI standard will also open the Macintosh market to PC board vendors, and it's possible that will mean lower prices and more expansion-board choices for users.

But not everyone is willing to wait until Apple unveils Power Macs with PCI slots. Apple developed the 8100/110 for high-end users who have invested big money in high-performance NuBus cards and who probably aren't thrilled at the prospect of abandoning their investment in NuBus in order to use PCI.

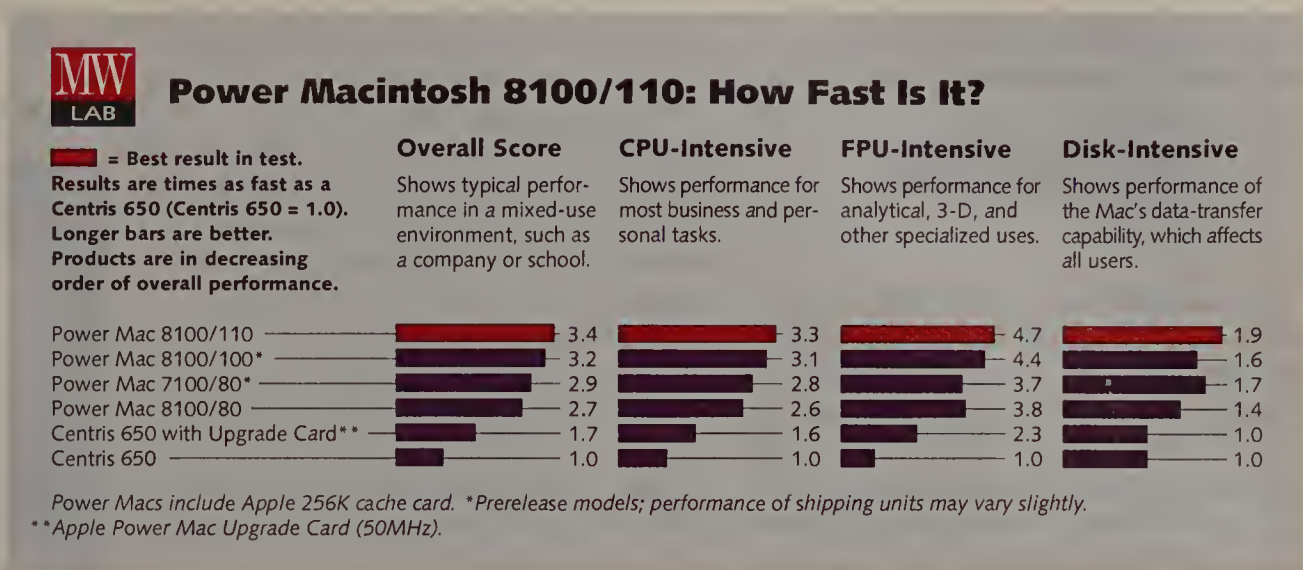
The Last Word

There are now more than 300 Power Mac–native applications, offering two to five times the performance of their 680X0 counterparts. Those users who adopted a wait-and-see attitude toward the Power Macs should now feel comfortable making the jump to the PowerPC platform. Desktop publishers and others who need top-of-the-line Macs will want to take a hard look at the 8100s.

But unless you need the NuBus fixes that the 8100/110 provides, buy a Power Mac 8100/100 instead. For most functions, the effective speed difference between the two machines is less than 10 percent. You can get an 8100/100 with the same configuration as the 8100/110 for about $800 less. Or consider the 7100/80, whose price/performance ratio and expandability make it one of the most attractive and powerful desktop machines you can buy.

With the ultraspeedy PCI expansion bus on the horizon, people thinking of moving to Power Macintosh–based video and high-end publishing may want to hold out. But users who have invested heavily in NuBus cards can protect their investment with this very fast version of the 8100. Apple continues to lower prices as it boosts the speed and configuration of the Power Macs, trying hard to keep the machines in the same price range as the latest Pentium systems. It's a buyer's market, but don't buy more Macintosh than you really need.

—MATTHEW HAWN AND DANNY LEE



LaserWriter 16/600 PS

Workgroup Printer

PROS: Excellent performance; PostScript fax options; attractive pricing. **CONS:** Unimpressive print quality. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** $2399.

MW ★★★★

APPLE'S LATEST WORKGROUP PRINTER, the LaserWriter 16/600 PS, is designed to replace the popular LaserWriter Pro 630 and the more expensive LaserWriter Pro 810. While the 16/600 PS looks and costs almost the same as the 630, the 16/600's new engine and faster controller offer improved performance.

Technical Specs

The LaserWriter 16/600 PS is based on the 16-pages-per-minute, 600-dpi, Canon LBP-ZX engine. It features Adobe PostScript Level 2 and HP's PCL 5 emulation, and includes optional PostScript fax capabilities. It also ships with Apple's latest QuickDraw GX driver.

As with most newer workgroup printers, the 16/600 supports automatic port switching and protocol sensing. This means that all ports and protocols are simultaneously active. The 16/600 has bidirectional parallel, serial, and LocalTalk ports, as well as an Ethernet interface that supports EtherTalk, Novell NetWare IPX, and TCP/IP. The 16/600 works with DOS and Windows PCs, Macs, and Unix systems.

The LaserWriter 16/600 PS sports a SCSI interface for storing fonts on a hard disk. The optional internal hard disk, which is extremely easy to install, has a capacity of 245MB and an estimated price of $399. This is a bargain compared with optional drives for the HP LaserJet 4MPlus and the Lexmark Optra LX.

The LaserWriter 16/600 ships with 35 built-in Type 1 fonts. In addition to the resident fonts, the 16/600 PS includes 29 TrueType fonts. To speed up TrueType printing, the printer has a built-in TrueType rasterizer.

The LaserWriter 16/600 can be upgraded with an optional network PostScript fax card (about $300). With this option, the 16/600 acts as a Group III and PostScript fax machine for all users on the network. Sending a fax is as easy as printing a regular document.

The 16/600 is powered by a fast 25MHz AMD 29030 RISC processor and includes 8MB of RAM, expandable to 32MB. It uses 32-bit SIMMs, as do Power Macs and the newer Quadras. The memory is user-installable.

Blazing Performance

The LaserWriter 16/600 is a much better performer than its predecessors were, due to the faster RISC processor and the higher-speed engine. For raw performance, the 16/600's engine is rated at 17 ppm for letter size and 16 ppm for A4 size —4 ppm more than the LaserJet 4MPlus and 8 ppm more than the LaserWriter 600 series.

Macworld Lab used a multiple-page text document with one font to test engine performance; the 16/600 clocked in at 41 percent faster than the Pro 630 and 19 percent faster than the 4MPlus. For processor-intensive tasks, such as printing complex PostScript documents, Macworld Lab tests showed the 16/600 to be 22 percent faster than the Pro 630 and a few percentage points faster than the 4MPlus. At the moment, the LaserWriter 16/600 is one of the fastest workgroup printers in its price range.

Unimpressive Output

The printout quality of the 16/600 is another story. A Macworld Lab line-art test file revealed that the 16/600 PS can't produce as fine a line as the LaserJet 4MPlus and the Optra LX. In fact, the 16/600's line-art output doesn't even look as good as that of the Pro 630 it replaces. For text output, the 16/600's FinePrint text looks as good as its HP Resolution Enhancement Technology and Lexmark counterparts at normal reading distance, but on closer examination it's not as crisp as the Optra's.

KEVIN CANDLAND

Macworld Lab installed another 4MB of memory in the 16/600 in order to use PhotoGrade, which should improve output quality for scanned images. Unfortunately, while PhotoGrade enhances the Pro 630's output, it doesn't help the 16/600 much at all.

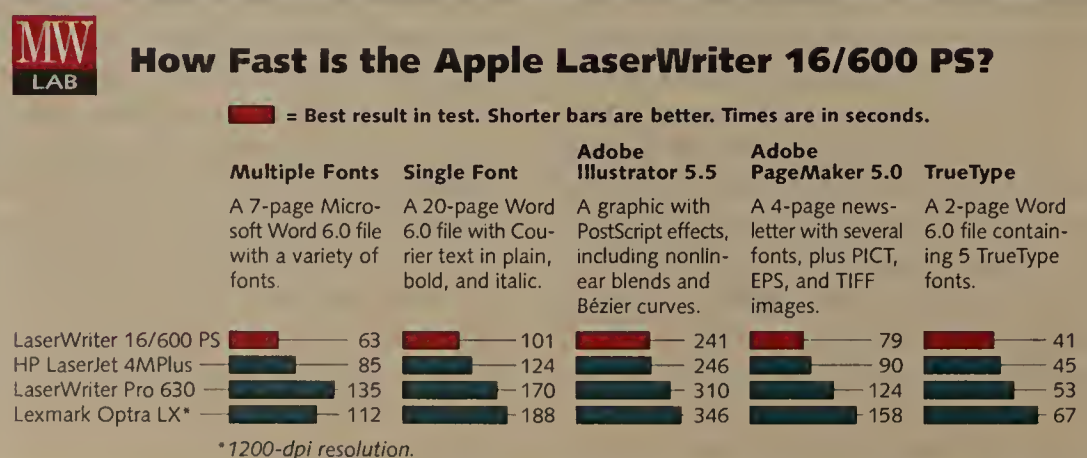
The LaserWriter 16/600's paper tray is a minor annoyance. It holds only 250 sheets of paper, or 350 with the multipurpose tray—not enough for a true workgroup printer. I recommend adding the optional 500-sheet cassette. Both cassettes support letter, A4, B5, and U.S. legal paper sizes. An envelope feeder that can automatically feed up to 75 envelopes is also available.

Setup of the LaserWriter 16/600 is straightforward. It took me less than five minutes to get the printer online and printing. The manual is nicely illustrated and easy to follow. The fax modem and RAM took only five minutes to install. And with only one screw to remove, the 16/600 PS is easy to upgrade.

As an Energy Star–compliant device, the 16/600 reduces power consumption and goes into hibernation after a predetermined time of inactivity.

The Last Word

All this for $2399—about half the cost of the LaserWriter Pro 810 and the same price as the much slower Pro 630. Apple has delivered another fine printer within a reasonable price range. If speed is what you need, the 16/600 is it. However, if you need to use your printer for better-quality work, check out the higher-dpi printers.—MARK HURLOW AND DANNY LEE



Nisus Writer 4.0

Word Processor

PROS: Unlimited undo; ten clipboards; powerful macro and find/replace functions; strong multilanguage skills. **CONS:** Seriously flawed table editor; antique mail merge; mediocre table-of-contents, index, and cross-reference functions; poor page-layout abilities. **COMPANY:** Nisus Software (619/481-1477). **LIST PRICE:** $495.

MW ★★★

NOW RENAMED AND GREATLY REvised, Nisus Writer 4.0 retains the trademark features that distinguished its predecessor, Nisus, from other word processors on the market. Unfortunately, it also remains a mixed bag.

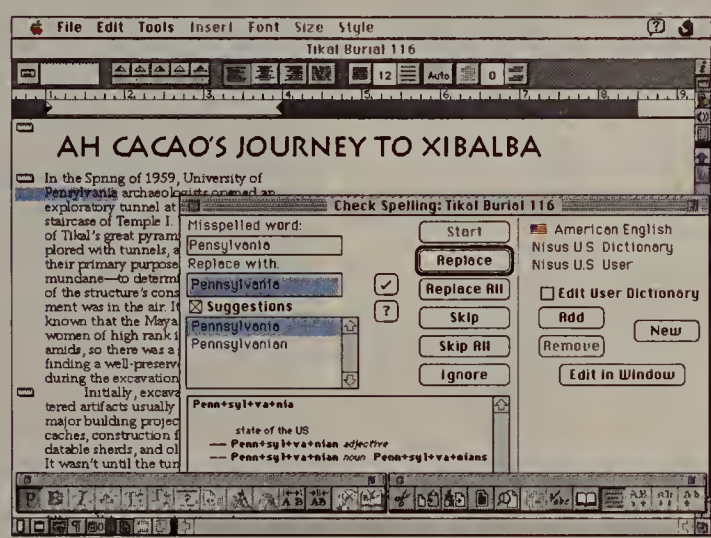
Particular Powers

Nisus can undo/redo an unlimited number of past actions. It allows you to select noncontiguous pieces of text. It has a powerful macro language—two languages, actually: a less powerful but more comprehensible Command Dialect, and a full-featured, rather daunting Programming Dialect. There's also a watch-me macro-recording mode and a large library of useful, annotated, ready-to-use macros. Nisus Writer also retains Nisus's legendary and still unequaled find-and-replace functions. The program offers three kinds of find and replace, in fact, so basic users won't be overwhelmed with detailed, power-user codes. And Nisus Writer, like its earlier incarnations, has powerful multilanguage skills found in no other word processor.

Nisus Writer of course has all the basic writing and formatting tools, plus smart cut and paste (which adds or removes spaces as needed), smart quotes, easy-to-edit and automatically expanding glossaries, and a ten-compartment clipboard. It does not, however, offer a built-in outliner, as-you-type error correction, or drag and drop between documents—all present in the current versions of Microsoft Word and WordPerfect. It can number lists, but the process is cumbersome. It has tool bars, but they aren't customizable, they float (and thus get in the way on a small screen), and many of the tool icons are indecipherable. Nisus Writer has both paragraph and character styles, but you can't define styles by example; and Nisus doesn't use styles intelligently to, for example, automatically apply styles to footnotes, table-of-contents entries, or indexes. And like previous versions, Nisus Writer 4.0 suffers from a poor, inefficient interface design.

Though it lacks a grammar checker, Nisus Writer comes with a collection of high-end editing tools. Its spelling checker is fast and efficient (see "Spelling Is a Pain"), and its thesaurus is among the best. But because you can't edit its rules, Nisus Writer's hyphenation feature is definitely not high-end.

Nisus Writer is unique among word processors in that it can also read aloud, with proper pronunciation, your English, French, Spanish, German, or Italian text. It also supports WorldScript and allows you to write in any number of languages—whether they run left to right or right to left—in one document. For right-to-left scripts, Nisus has matching rulers and footnotes. Oddly, you cannot mark roman text as French, Spanish, or whatever, so that the program will automatically use the appropriate spelling checker, hyphenation file, and thesaurus.



Spelling Is a Pain Although it's quick and easy to use from the keyboard, Nisus Writer's spelling checker dialog box is a textbook example of poor design. As shown here, the definition dictionary (sold separately) just makes a bad design worse.

The Long and Short of It

Nisus Writer can insert both footnotes and endnotes, but not both within a document. It can generate single-level tables of contents, but generating additional lists for the same document, such as a figure list, is unnecessarily difficult. Cross-referencing other parts of the document is also more difficult than need be. Nisus Writer can compile indexes (single-level only) from marked words (marked manually or using a handy find-and-replace option) or from a concordance, which it can help you create by generating a list of all the words in the document.

Nisus Writer comes with Design Science's MathType 3.0, a highly regarded equation editor. Nisus's table editor (Macreations' Tycho TableMaker), however, is seriously flawed, primarily because it cannot create tables more than one page long; nor can it split a table over two pages. Also, many Nisus features—such as unlimited undo and noncontiguous selection—don't function within a table, and you cannot mark table text for a cross-reference or index or table-of-contents entry. Another disappointment is Nisus Writer's mail merge function: as with most antiques, hard manual labor is the only thing that makes it work.

More than Words Can Say

With the program's built-in, small-scale drawing program you can draw directly on the page. You can also import graphics in PICT, EPS, TIFF, and MacPaint formats, as well as QuickTime movies. Nisus Writer can insert graphics behind text to create a watermark and can use a Nisus Writer page as a graphic within another page. It allows only one column format for the entire document, and all columns must be the same width. Because the only view that displays graphics and multiple columns as they will print is not editable, creating complex, multicolumn layouts is a considerable chore.

Nisus Writer maintains menus of recently used files and user-specified "essential" files, and has a convenient Catalog window from which you can open or print files in batches. Nisus Writer files are readable by most other word processors (as unformatted text), and the program can read any file format for which it has an XTND filter (only MacWrite II, RTF, and Word 4 and 5 filters are provided). Its five manuals come to 1100 pages, are poorly organized, and have no central index.

The Last Word

Still a David among the Goliaths of high-end word processing, Nisus Writer is difficult to assess concisely. It is a poor choice for many typical high-end uses, including long or multicolumn documents, table creation and editing, and mail merge. In a few specialized areas, however—such as mixing English and other non-Romance languages (Japanese, for example), and its complex find and replace—Nisus Writer is unmatched. If your word processing needs closely match Nisus Writer's limited strengths, go for it. If not, head for Word (5 or 6) or WordPerfect.—ROBERT C. ECKHARDT

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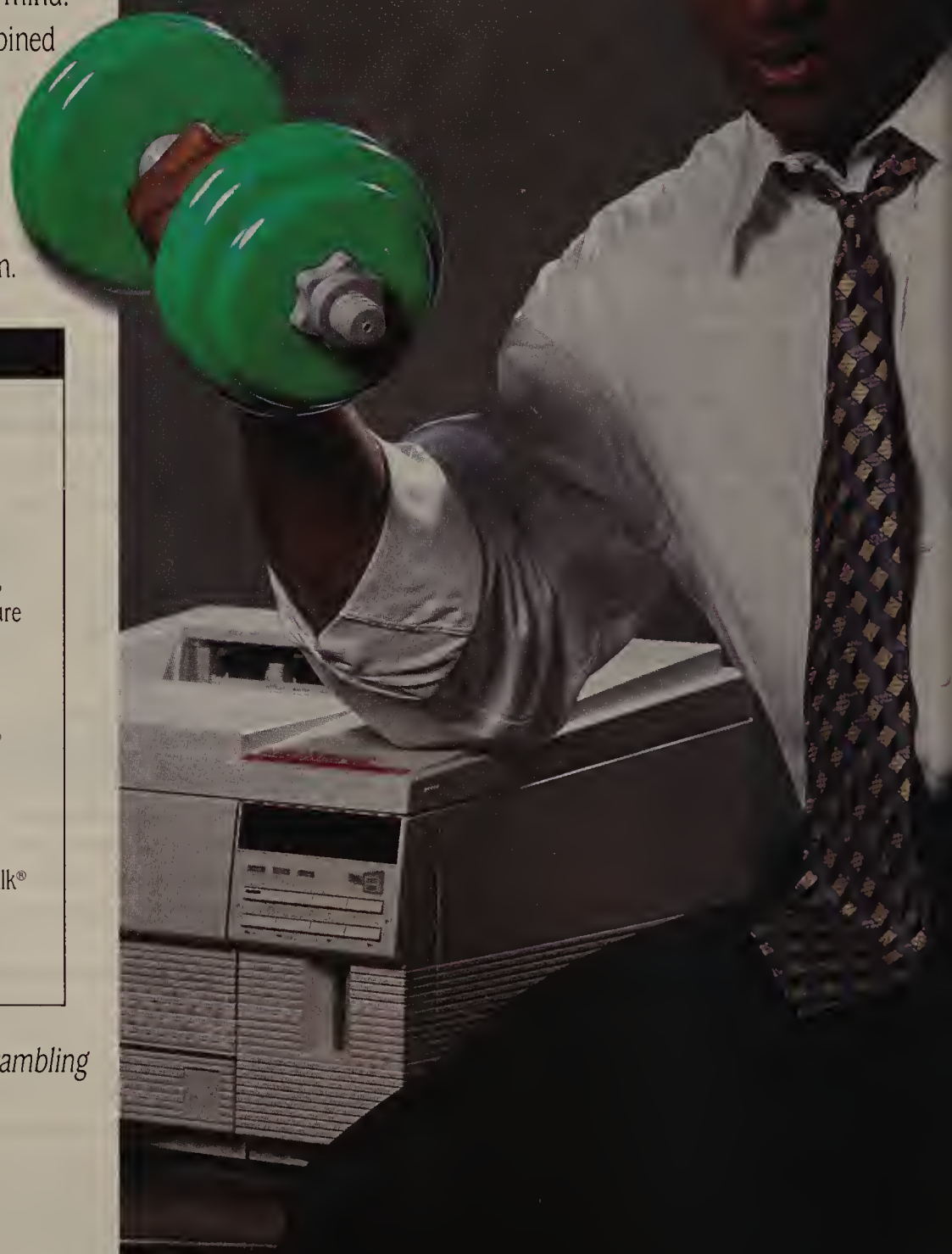

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Adobe PostScript

Circle 112 on reader service card

PixelPaint Pro 3.01

Color Paint Program

PROS: Excellent Wet Paint and PixelLayers features. **CONS:** Sluggish performance when using built-in virtual memory. **COMPANY:** Pixel Resources (404/449-4947). **LIST PRICE:** $379.

MW ★★★★

ALTHOUGH IT WAS ONE OF THE first Mac color painting programs, PixelPaint has languished in recent years. But after major renovations by its original developers, PixelPaint Pro 3 offers professional-level painting and image processing tools at an attractive price.

Not Just a Maintenance Upgrade

In version 3.01, those niggling little bugs that hampered release 3.0 have, as far as I could determine, been squashed. Also, support for pressure-sensitive tablets, such as those from Wacom, has been improved. And time-consuming operations, such as rotating images, moving layers, and applying special effects, have been optimized, making the program more responsive.

However, beyond tweaks and fixes, PixelPaint Pro 3.01 adds compatibility with System 7.5 and full support for the Pantone Open Color Environment (POCE), a color-selection and -management system. Consequently, this version constitutes a fairly significant upgrade, especially for professional users needing precise color matching.

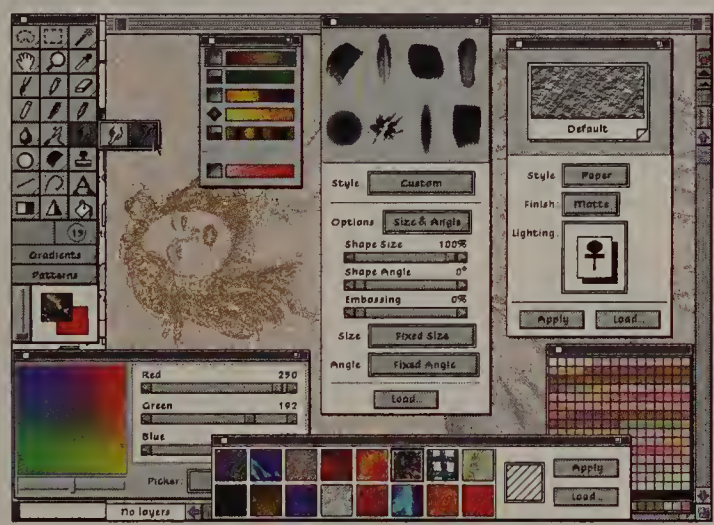
Pantone Open Color Environment

Matching screen colors to printed output has always been a problem, due to the inherent differences between the way computer monitors and printing devices reproduce color. With POCE, you select colors using the new Apple Extensible Color Picker, which lets you switch between color models. Pantone provides two models: one for the Pantone Matching System and another for the Pantone Process Color System. The colors in the Pantone pickers are calibrated to the monitor and output device you select using the Apple ColorSync Profile and Pantone Profile control panels. Slider gauges tell you if a chosen color is out of gamut, letting you correct color problems on the spot. And buttons let you select your output stock: coated, uncoated, or film for separations.

You can associate specific ColorSync and Pantone profiles with individual documents and then preview the output colors on your screen. Although the preview cannot exactly match what the output device will produce, it can provide a decent approximation. You can then isolate any out-of-gamut colors using masks and correct the colors before committing your creation to print.

A Traditional Interface

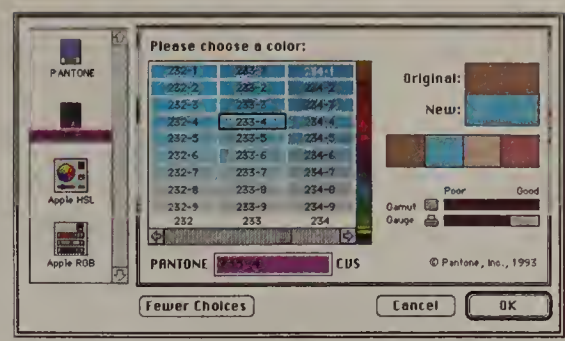
Bucking the trend toward natural-media simulation, PixelPaint Pro 3 doesn't even pretend you're working with real materials. Without apology, it offers a traditional Mac environment that relies on unobtrusive tool icons and functional, conservatively sized floaters. Extra brushes, gradients, patterns, papers, and color palettes are available as plug-in extensions either from floating palettes or by using keyboard commands.



Right at Home PixelPaint Pro 3's traditional-looking Macintosh environment organizes most functions into floating palettes that you can toggle.

PixelPaint Pro 3's Expressionist Brush floater is particularly impressive. These brushes produce many different painting and rubber-stamping effects, and they're completely editable, letting you alter their size, angle, and various other parameters.

Also excellent is PixelPaint Pro 3's Wet Paint feature. It lets you edit brushstrokes as objects before painting with them. Like an illustration program, Wet Paint lets you define a path and edit control points before finalizing the stroke. In addition, the ReShape command lets you return the last painted object to Wet Paint mode, even after the object has been set down in the image.



Running the Gamut PixelPaint Pro 3's Pantone color pickers let you know instantly if the selected color is out of gamut with the chosen output device.

PixelPaint Pro 3 lets you define selections as floating objects, called PixelLayers. These remain active until you drop them onto the document image. With the Layer Control palette, you can soften the edges of a PixelLayer to composite images without telltale edges. PixelLayers can be created only by specifying areas with the selection tools. So if you build a Wet Paint object, you must set it down on the page, select it, and then transform it into a layer. The ability to define a PixelLayer directly from a Wet Paint object would be a slick enhancement.

In addition, PixelPaint Pro 3 provides a useful array of filters for image processing functions and offers a scripting capability that allows you to record command sequences (but not brushstrokes) and replay them on other images. You also manage both imaging filters and scripts as plug-ins, letting you easily customize the program's feature set.

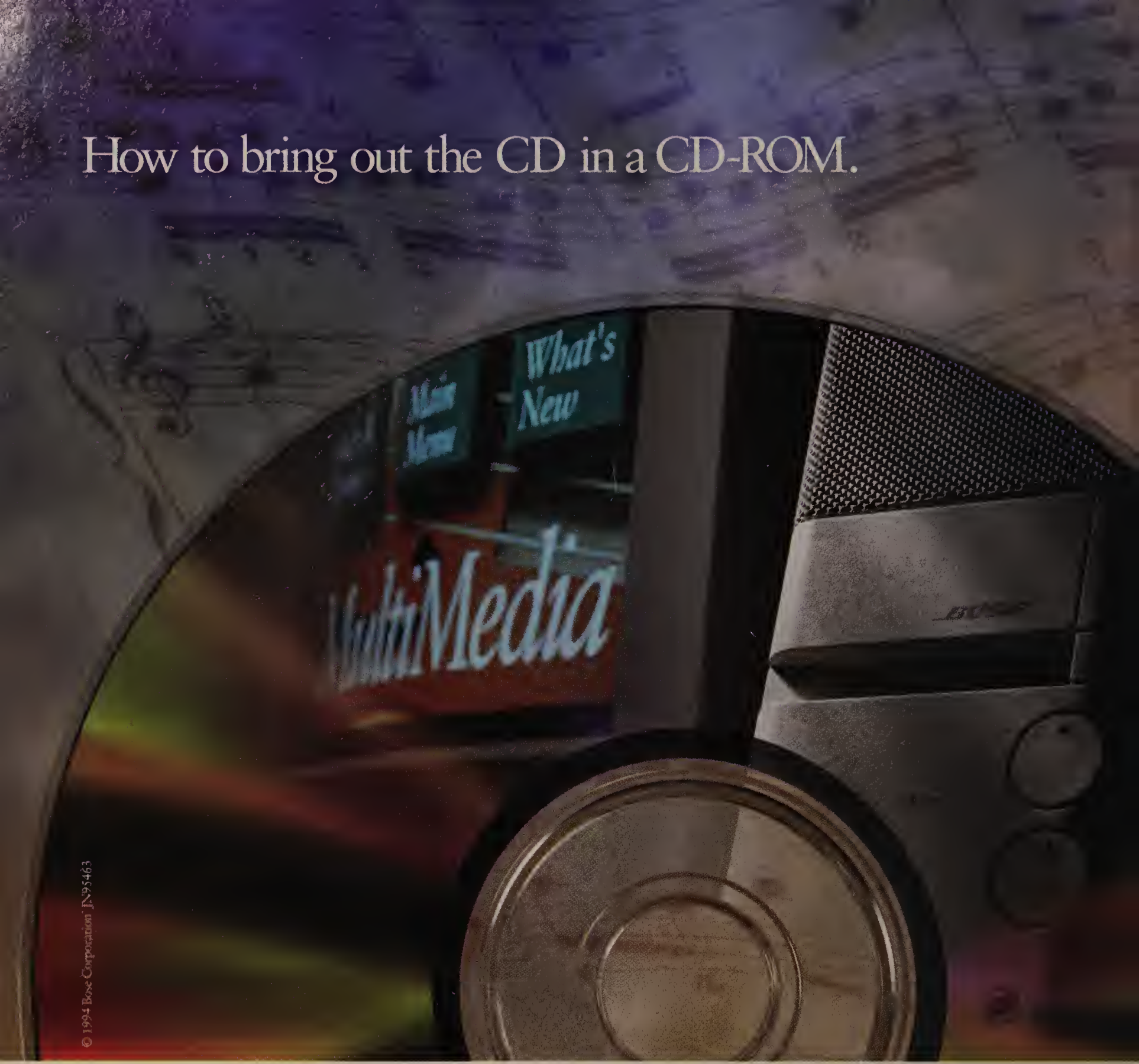
PixelPaint Pro 3's manual is well organized, readable, and a good source for background information. If you're a color-imaging novice, reading this manual provides a quick education. The program's built-in virtual memory scheme for document management makes it usable with RAM-challenged Macs, but relying on virtual memory makes for slow going. One solution is a fat memory allocation (a minimum of 8MB to 12MB). Another is to get the fastest Mac you can afford. My recommendation, especially for professional users, is to do both. By the way, the Power Macintosh–native version should be available by the time you read this.

The Last Word

Although surpassed by Adobe Photoshop in imaging prowess and by Fractal Design Painter in natural-media simulation, PixelPaint Pro 3 strikes a good balance between the artistic demands of color painting and the technical precision of image processing. That balance, and first-rate color-matching resources, make PixelPaint Pro 3 an excellent choice for professional artists and illustrators.

—CARLOS DOMINGO MARTINEZ

How to bring out the CD in a CD-ROM.



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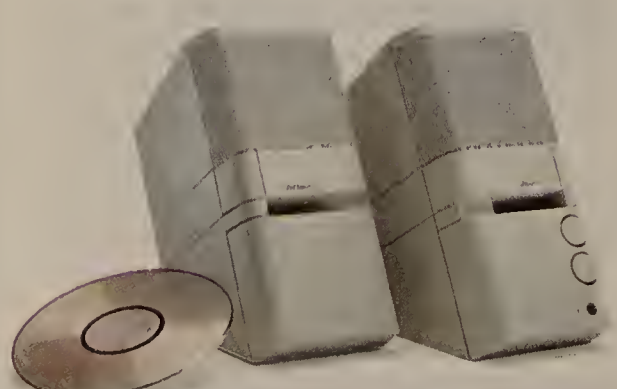

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Apple PCMCIA Expansion Module

Expansion Option for PowerBook 500 Series

PROS: Excellent hardware-software integration and performance; simple to configure. **CONS:** Requires you to give up a battery port; PC cards are expensive. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** $219.

MW ★★★

APPLE'S PCMCIA EXPANSION module for the PowerBook 500 series is a well-integrated, well-designed unit that offers 500-series users an efficient and easy, albeit expensive, way to add features to their PowerBooks.

A Little Background

PCMCIA is an acronym for Personal Computer Memory Card International Association. This association developed a set of standards designed to make computer expansion easy. PCMCIA cards (mercifully rechristened PC Cards by the PCMCIA in November) are credit card–size peripherals, like memory and modems. They are power-efficient, lightweight, and fast, making them ideal mobile-computing products.

As with a lot of DOS and Windows expansion options, though, you had a better chance of winning the lottery than of configuring these cards with anything short of divine intervention. Developers were sloppy in their first implementations of the PC Card standards, rushing to get their products to market before the competition. The PCMCIA has now worked out the kinks, though, and PC Cards are hitting their stride. They're already a standard expansion option on many PC laptops and the Newton, and you can expect to see slots for PC Cards on almost every laptop made in the next few years, including Apple's PowerBooks.

Pick a Card, Any Card

Apple's wallet-size expansion module slips into the left-hand battery bay of PowerBook 500's and provides slots for two smaller (Type I or Type II) PC Cards or one larger (Type III) card. Built into the module is a 16MHz Motorola 68030 processor that plugs into the PowerBook's PDS slot. A PC Card slides into the slot much like a floppy into a drive.

Initially, the most common type of card available for the module will be Flash ATA memory cards (mostly Type II cards). Flash memory is solid state memory, as opposed to slower, rotating, magnetic memory like that of floppies or hard drives. Flash memory cards work a lot like RAM disks, saving power and increasing performance by avoiding hard-disk or floppy access. But you'll pay top dollar for these cards: a 5MB flash memory card costs about $400.

Modem PC Cards are as common as flash memory on PC laptops, but because the 500 series reserves space for an internal modem, these Type II cards probably won't be as popular with PowerBook 500–series users. Prices are comparable to internal modems (about $300), but you need to factor in the module's price.

Another type of storage for the module is Type III PC Card hard drives. These are miniature versions (1.8 inches across) of standard hard drives that you can use as removable media. They aren't cheap either: a 130MB Type III hard drive is about $500.

Apple expects other PC Cards to be available in the next year, including pager cards, wireless network cards, global positioning cards, and Token Ring connection cards. Apple hasn't mentioned ROM cards, like those the Newton uses, but third-party vendors could offer read-only files (like street maps or restaurant reviews) that benefit from the speed and low power requirements of ROM cards.

Most PC Cards now available are made with DOS and Windows laptops in mind, but PC Cards are designed to be platform-independent. While the module won't support all the PC Cards out now, Apple says it will offer updated software to handle fancier cards as they become available. A general software update should be available before summer, at the same time that Apple releases a developer kit that will allow developers to write drivers for their PC Cards.

Using the Module

The first Macintosh PCMCIA product is an elegant example of how PC Cards should work. I slid the module into the battery bay, turned on the PowerBook, dropped a control panel and two extensions into the System Folder, and was ready to go. The module supports hot swapping, which means you don't have to power down or restart the computer after you insert a PC Card.

Memory cards appear on the desktop as icons. You can eject them in one of three ways: drag the icon to the Trash, or use the PCMCIA control panel or the PCMCIA icon in the PowerBook Control Strip. Modems don't appear on the desktop, but the communications programs I tried (including Aladdin Systems' SITcomm, America Online, and a variety of fax software) had no problem recognizing the modem as a regular modem choice in their configuration dialog boxes.

This is a far cry from PC Card implementation for most PC laptops. The documentation included with the PC Cards listed page after page of complex directions for a variety of DOS notebooks. Apple's version of the PC Card software/hardware, however, is nearly seamless. This isn't to say you won't have to configure some PC Cards for the PowerBook, but the configuration won't require an advanced computer-science degree.

The Last Word

Do the PowerBook 500's need a PC Card expansion option? The 500's already support Ethernet and LocalTalk, and have space for internal modems and ports for external drives and peripherals. But PC Cards do offer some advantages. You can be sure that Apple will include PC Card slots in its future laptops (see "Apple's Secret PowerBook Plans," *News*, *Macworld*, February 1995), in some desktop machines, and even in printers.

If you can overlook the early-adopter prices (a big if), the PC Cards are great expansion options—lightweight, low-power, and high-performance. When prices come down and Apple has the support of third-party vendors, PCMCIA on the Macintosh will be more than just a flashy card trick.—MATTHEW HAWN

RICHARD RETHEMEYER

The installed PCMCIA module with More's MiniStor 130MB drive, Sundisk's 1.8MB flash disk, and Motorola's CELLect 14.4 fax modem.

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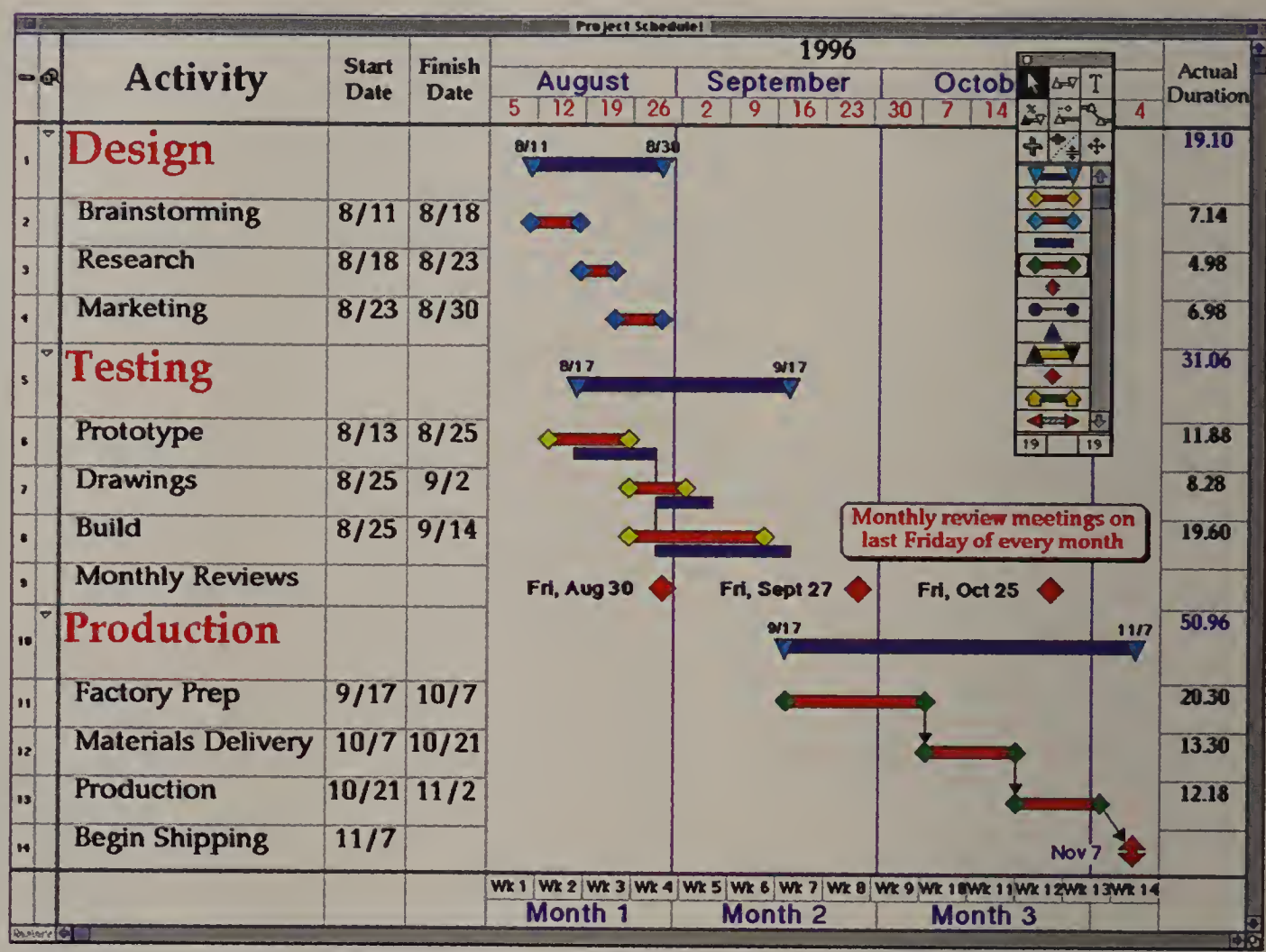

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Adobe Acrobat 2.0

Portable-Document Software

PROS: Includes freely distributable viewer; works across platforms. **CONS:** Font fidelity is uneven; software is fairly resource-intensive; creating hypertext documents is difficult; poor technical support. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** Single-user edition $195; workgroup edition (ten users) $1595.

WORKGROUP EDITION:

MW ★★★

SINGLE-USER EDITION:

MW ★★

MW LAB THINK OF THE ONCE LUSH FORESTS of the Pacific Northwest, now rendered into vast, depleted tracts with lonely spotted owls searching fruitlessly for shelter and sustenance. Think of the pages and pages that spew forth from your laser printer and photocopier. Think of the time it takes to prepare, deliver, and sort your mail. There must be a better way, and Adobe Systems is convinced that its Acrobat family of software is it.

Acrobat 2.0 has been redesigned to become more of a document-management and -annotation tool. (Adobe product managers have privately admitted that the environmental message didn't do too much to boost sales, so now the emphasis has turned to business productivity and collaboration.)

Unfortunately, Acrobat 2.0's emphasis on corporate document sharing may make the product less useful for the other major component of the portable-document market: the electronic distribution of forms, catalogs, lists, newsletters, and the like.

The Acrobat Family Tree

Exactly what does Acrobat do? At its most basic level, it adds a print driver to the Mac (or Windows PC) that lets you "print" any document from any program into an Acrobat-format file that contains the text and images of the original file for viewing and even searching by users who don't own the originating program or fonts. This basic function is handled by Acrobat Exchange, the core product in the Acrobat family and the program that makes up the $195 Acrobat 2.0 single-user package.

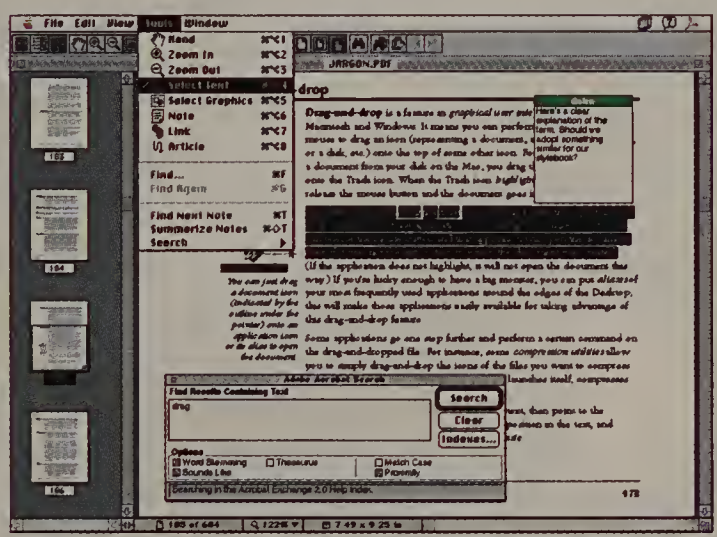
If you have a bunch of PostScript print files—say, CAD drawings from Windows AutoCAD or technical manuals from Unix Interleaf—you can convert them to Acrobat format with Acrobat Distiller, a program that comes bundled with Acrobat Exchange in the $595 Acrobat Pro 2.0 package.

If you want your whole company to go Acrobat, you can get the $1595 Acrobat for Workgroups 2.0, which includes ten licenses for Acrobat Exchange and one for Distiller (both Mac and Windows software is included for each), plus the Acrobat Catalog program, which creates search indexes over a network, so you can search for, say, information on *Macworld* in all documents on the Media server, rather than open each file and search its contents separately.

To Thine Own Self Be True

These options sound great, but the execution leaves something to be desired.

The most frustrating part of Acrobat is the fidelity of the portable documents it creates, or actually its unevenness. Acrobat 1.0 did not do well with many fonts, and Acrobat 2.0 does only a little to correct this. The problem is in how Acrobat represents fonts. When you create a portable document, Acrobat uses Adobe Type Manager's font database to match the fonts you use against the fonts ATM knows about. When you display an Acrobat document on a system that doesn't have the font, ATM uses its Multiple Master technology to emulate the font. For decorative, symbol, nonroman, and highly stylized fonts, this approach doesn't work.



Acrobat Exchange 2.0 Acrobat Exchange 2.0 really shines in its search and annotation tools. You can search for text across documents (using the Sounds Like and Proximity options), as well as add notes, create links across pages or Acrobat documents, and copy text and graphics to other documents.

Understanding this problem, Adobe has now given Acrobat the ability to embed fonts in the document, so they move to the recipient's system with the document (but just for viewing that document). This approach increases the document size—the amount depends on how many characters are used per font—but helps ensure fidelity.

But the font-fidelity issue is not solved that easily. For some fonts—including some of the symbols that ship with the latest version of ATM—Acrobat substitutes a bitmapped representation (a graphic) of the text in the portable document. These bitmaps greatly slow down scrolling, although they do ensure decent-quality output. But because the text is converted to bitmaps, you can't search it or cut and paste it into other programs. There's no way to know which fonts will be converted to graphics until you open the portable document.

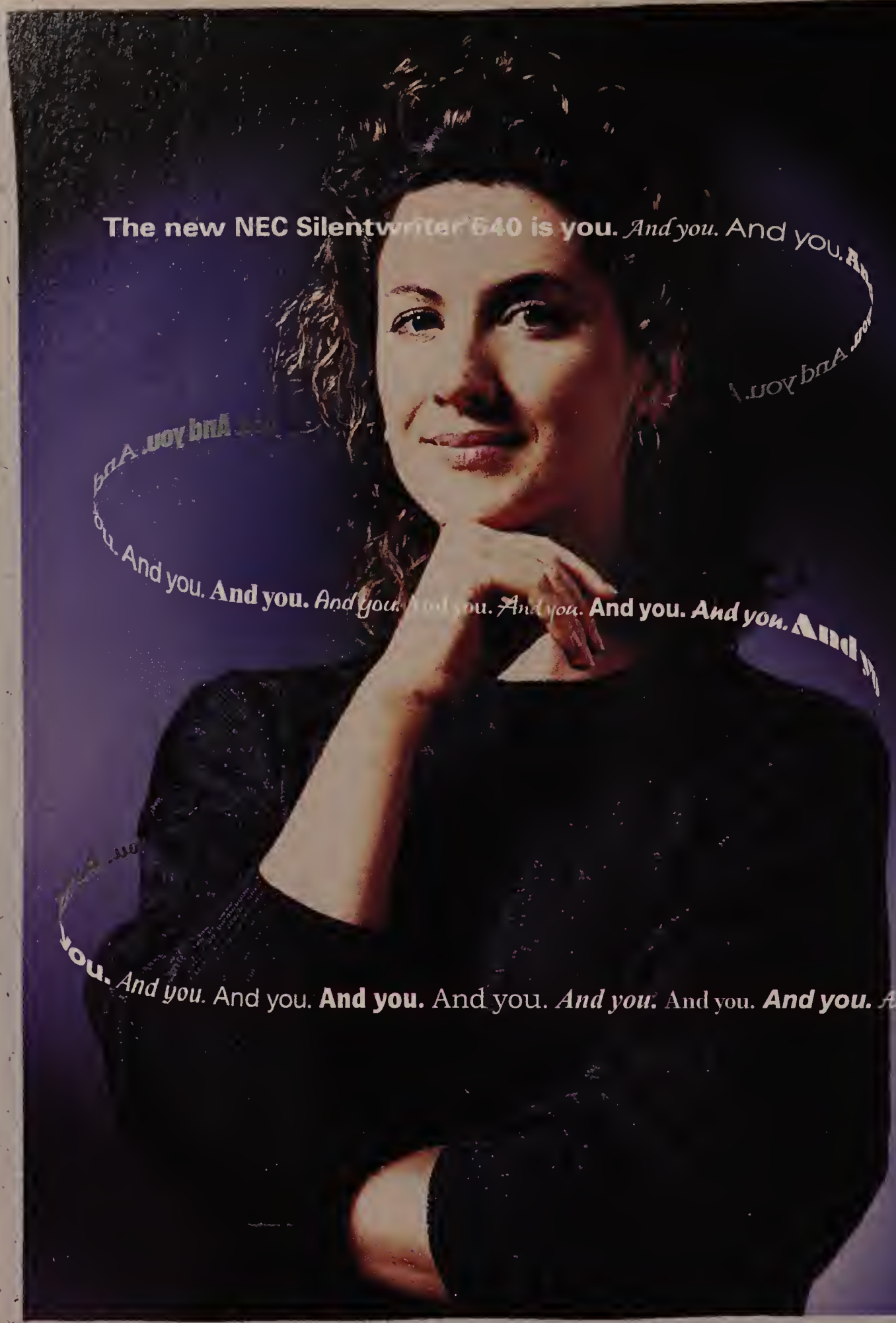
The other significant problem in working with fonts and Acrobat is that the recipients must have ATM 3.6 or later installed on their system (ATM 2.6 or later for Windows). Acrobat Reader, which you can give to people who don't own Exchange, comes with a limited-edition version of ATM 3.8.1. If the recipient does not own a copy of ATM, he or she must install this limited edition of ATM to launch Reader. Fine, but to emulate fonts (the whole point of Acrobat's reliance on ATM) Reader requires that the full-version ATM 3.6 or later be installed—even if the limited edition is installed. That makes no sense.

Bloated Requirements

The need for ATM on every recipient's system points to another concern users should have with Acrobat: resource requirements. Reader's installation program takes about a megabyte, so you can share Reader with others via floppy. But it's too fat for routine downloading from a BBS or for E-mail transfer over a network. Once you install Reader, it will have consumed 3MB of your hard disk. Exchange—the program you'd use if your company has standardized on Acrobat as a document-exchange system—takes 4MB, plus another 4MB for ATM 3.8.1, which it comes with.

Other portable-document software is more efficient. No Hands Software's Common Ground 1.1.2 ($189, 415/802-5800) takes only about 1MB—and it doesn't require ATM or any other such technology. Nor does Common Ground require a viewer program: you can embed

continues



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NEC

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the viewer directly into your Common Ground document, at the price of about 300K. If you want to distribute the Common Ground MiniViewer, it takes just 92K. Common Ground remains the best portable-document technology for electronic distribution, since it avoids the font-fidelity issues and resource requirements of Acrobat.

Macworld Lab found Acrobat Distiller to be unusable often: it could not process moderately complex files (with several images or a dozen or so fonts), even with 40MB of RAM allocated to it. Distiller takes at least 6MB of RAM, but that amount increases quickly as documents get more complex.

Another resource requirement to note is the cost of getting help for Acrobat. Adobe provides one free, 15-minute call (via a toll number) to customers (two calls for Acrobat for Workgroups). Additional calls are $25 each, or $2 per minute after three free minutes. In three calls, I found technical support to have little knowledge of the product. I spent more than 20 minutes on hold for one call and 15 minutes for another, with no option to leave a message.

Finally, Acrobat is incompatible with System 7.5's QuickDraw GX (even though Adobe's ATM/GX comes with it).

Collaborative Computing

Where Acrobat shines is in its Workgroup version. The annotation tools are well done: you can have multiple users add Post-it–like notes, each with the person's name so you can tell who said what. You can add hypertext links within and across documents, so you could use Acrobat to develop shared documentation such as company policies, phone lists, or training manuals. Adobe uses Acrobat to create the online documentation for Acrobat and Photoshop.

But Acrobat is not a documentation tool like Frame Technology's FrameMaker. You have to do all the formatting in a word processor (including the graphics used for buttons) and then apply the links in Acrobat. It'd be easier to do the formatting and linking in the same place, but this is the price you pay for being able to use any program you want to generate the portable documents.

And keep in mind that Novell's WordPerfect Envoy 1.0 ($189.95, 801/225-5000) offers similar linking and annotation features and does not require ATM. However, Envoy fares even worse than Acrobat does for font fidelity: Envoy can neither embed nor emulate fonts, so faithful reproduction requires having the same fonts installed on the originator's and recipients' systems.

If you use Acrobat Catalog to index documents (Catalog creates a word list with pointers to documents that Exchange's search facility can use to find text across several documents), you'll have more flexibility in your searches. This method is particularly helpful for documents archived on a server that everyone in a department will want to search, since it allows for variations in how each person specifies the search.

For example, you can have Acrobat search for words that sound like the word you entered. (If you enter *wierd* and use the Sounds Like option, Acrobat will find *weird*.) Or you can search for variations of a word based on verb tense or other grammatical variations. (For example, enter *go*, and Acrobat will find *went*, *going*, and *gone*.) Anyone who has Exchange can do these searches, but only for documents that were indexed by Acrobat Catalog. For nonindexed documents, you have just basic search facilities (whole word, case-sensitive, backward, and forward) to choose from.

Unfortunately, Acrobat Catalog runs only on Windows servers, and it does not work with Farallon Computing's PhoneNet software, which adds the AppleTalk protocol to a PC. You must use Novell NetWare or another networking protocol to have Catalog index Acrobat files on a Macintosh client. Catalog also makes users choose which indexes they want to search; that requirement will baffle users who expect Acrobat to find all search instances automatically.

The Last Word

If you're looking at Acrobat Exchange to make it easier to exchange documents, you may just find it simpler to standardize on a set of fonts and programs—like the word processor in which you create your documents—and avoid the need for Acrobat altogether. Just print your files and use real Post-its.

If you're looking for a collaboration tool, Acrobat for Workgroups makes more sense. With ten copies of Exchange, one copy of Distiller, one copy of Catalog, and unlimited license to distribute Reader to Macintosh and Windows users, Acrobat for Workgroups is cheaper than buying everyone their own copy of Exchange. You can easily set up centralized shared documents with Acrobat.

Adobe is pushing Acrobat into the shared-document market, which has been largely based on proprietary, expensive tools. Bringing a fairly open program into that market should benefit many corporate users. But if you're looking for less-ambitious sharing, look elsewhere.

—GALEN GRUMAN

SECOND LOOK

Ray Dream Designer 3.1.1

3-D–Graphics Program

PROS: Useful modeling tools and excellent rendering at an affordable price. **CONS:** Poor error trapping can still lead to unstable operation. **COMPANY:** Ray Dream (415/960-0768). **LIST PRICE:** $349.

MW ★★★

WHEN WE LEFT OUR story (*Reviews*, *Macworld*, July 1994), Ray Dream Designer 3.03 offered improved modeling tools, enhanced access to surface-shader parameters, a better-coordinated interface, and a lower price. But alas, it had also fallen prey to unstable operation and various nagging bugs.

In this chapter, our protagonist exhibits a general improvement in character. The offending bugs are largely under control, and the optimized code results in faster performance, even on standard Macs. Although still subject to occasional lapses, Ray Dream Designer 3.1.1 has largely mended its ways.

Ray Dream Designer is a 3-D–graphics program that provides competent (if sometimes awkward) modeling tools, offers excellent surface-texturing capabilities, and produces high-quality ray-traced renderings. Although traditionally schooled illustrators may require a period of adjustment to learn to use the program effectively, Designer is well suited to the needs of graphic artists.

Designer 3.1.1's speed improvements make it usable on 680X0 Macs. However, it now runs in Power Mac–native mode, so if you can, go with a Power Mac. The performance gain makes building complex models and scenes more efficient and pleasurable.

Designer 3.1.1 still misbehaves occasionally. For example, error trapping remains suspect. Even simple things, such as canceling dialog boxes, can sometimes cause Designer to quit. But such problems are less common than in the previous version.

Ray Dream Designer 3.1.1's combination of useful 3-D modeling tools and first-rate rendering at an affordable price make it an excellent value.

—CARLOS DOMINGO MARTINEZ

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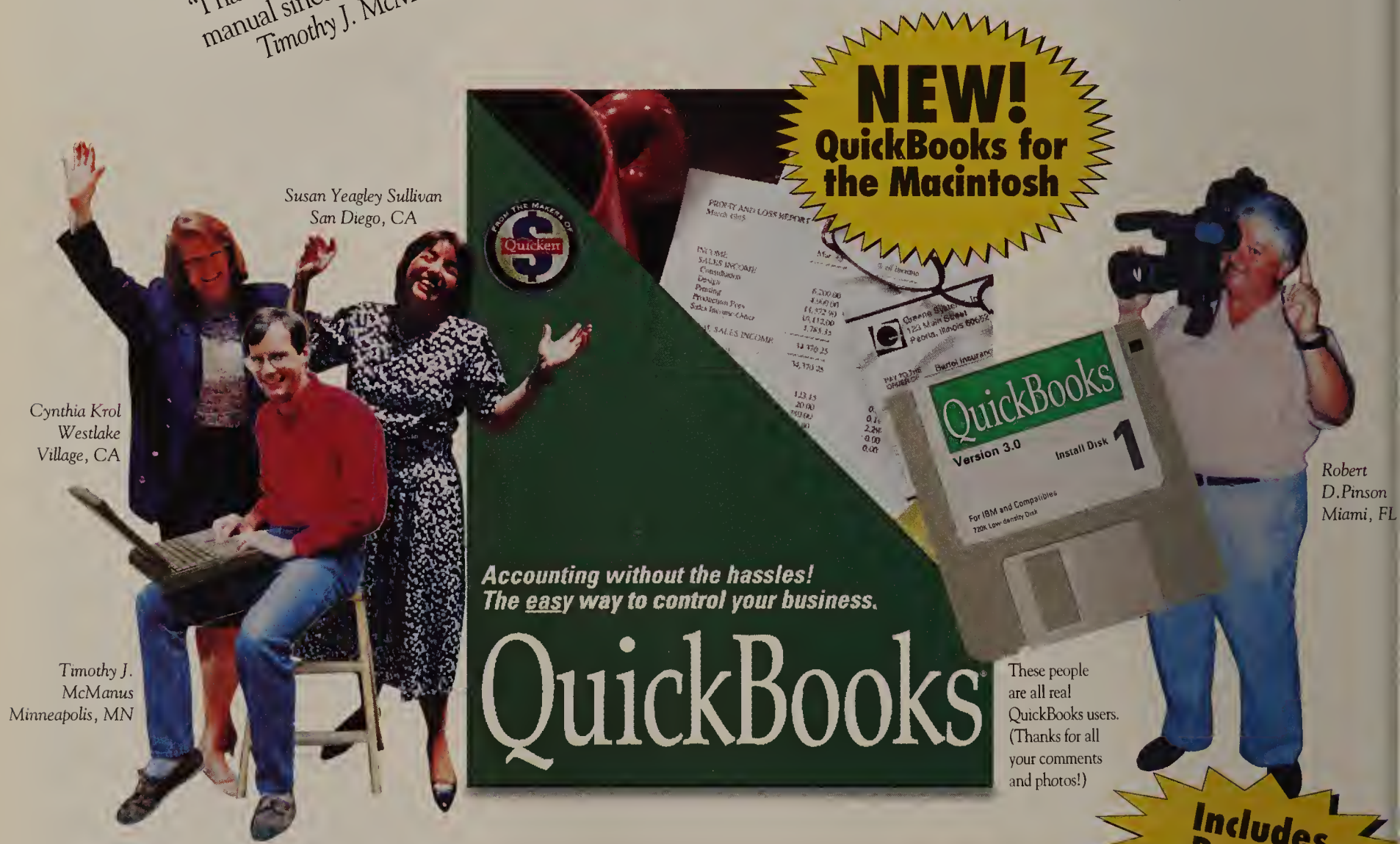

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DigiTrax 1.1

Audio-Recording Software

PROS: Easy to use; built-in parametric equalizer; supports 22kHz sampling rate; built-in audio-CD controls; good value. **CONS:** Supports fewer tracks than its competition; no true scrubbing feature; fade and pan editors could be more precise; limited Undo command.
COMPANY: Alaska Software (408/738-3320).
LIST PRICE: $349.

MW ★★★

DIGITRAX TURNS A QUADRA 660AV or 840AV into a digital audio deck that can record and play up to six tracks of CD-quality sound. You can overdub parts to create a complete arrangement, you can electronically snip a flubbed word or rearrange a sentence or musical phrase, and you can mix, or *bounce*, multiple tracks to a single track without degrading the sound quality.

Among digital audio programs, DigiTrax is a relative newcomer, having shipped nearly a year after its closest competitor, OSC's Deck II (see *Reviews*, *Macworld*, June 1994). The two programs make for some interesting comparisons. Although DigiTrax falls short of Deck II in many areas, it more than holds its own in others.

Similar Styles

DigiTrax and Deck II share similar operating styles. Each program provides a mixer window with sliders and volume meters for adjusting sound levels; a transport window with play, pause, record, rewind, and fast-forward buttons; and a time-line window that graphically displays the audio waveforms in each track. By and large, I found DigiTrax's look and feel to be a bit more polished than Deck II's. Also, DigiTrax's Transport window adds a section that lets you control an audio CD—which is handy for recording tracks from an existing CD. Deck II lacks this feature.

When you begin a new recording session, you can specify a sound-sampling rate of 22kHz, 24kHz, 44kHz, and 48kHz, the last providing the best quality but using the most disk space. Deck II can record at sampling rates of only 44kHz and 48kHz. Now, an audio professional would cringe at the idea of recording at 22kHz—roughly AM table-radio quality—so it's understandable that Deck II wouldn't support that low a sampling rate. However, an audio amateur who's playing with sound on a limited disk-space budget might be willing to trade some quality for the ability to make longer recordings. (A 22kHz stereo recording uses half the disk space of a 44kHz one—5MB per minute versus 10MB.)

Like Deck II, DigiTrax 1.1 provides automation features that record adjustments you make to the program's on-screen volume sliders and left-to-right panning controls. (Version 1.0 lacked automation support.) DigiTrax's automation features aren't as sophisticated as Deck II's, however. For example, DigiTrax doesn't let you play back only panning automation or only volume automation—it's an all-or-nothing proposition.

Altering Audio

Both DigiTrax and Deck II provide a tracks window where you can slice and dice audio as well as alter volume and panning information. Alas, DigiTrax doesn't let you undo a volume or pan adjustment (you can undo a cut or paste). Also, DigiTrax doesn't provide a precise digital readout of volume or pan values as you adjust them; Deck II does.

Tracks in DigiTrax DigiTrax's primary windows (clockwise from upper left): the Mixer window, the Timeline window (note the diagonal line indicating a fade-out), the Equalizer window (here, a narrow band of frequencies around 1000Hz is being boosted), and the Transport window.

DigiTrax also lacks Deck II's array of track processing options, which simplify creating smooth fade-ins and fade-outs as well as cross-fades, in which one or more tracks fade out while others fade in. But only DigiTrax provides a powerful built-in parametric equalizer, which lets you boost or attenuate certain frequencies to compensate for shortcomings in an original recording or just enhance the overall sound. DigiTrax also provides other sound-altering filters, such as flanging and chorusing, but these are of limited practical use.

An important tool for sound editing is a scrubbing feature, which lets you slowly play a recording backward and forward in order to locate an exact spot. One of DigiTrax's biggest shortcomings is its lack of true scrubbing; it can play a recording at half speed, but not backward. In Deck II, you can scrub a recording backward or forward, and at continuously variable speeds.

Both DigiTrax and Deck II let you open QuickTime movies and add to and alter their sound tracks. Both also support a live-video window, which can display the video feed from a camcorder or video deck. Both programs can also work alongside a MIDI sequencer program such as Mark of the Unicorn's Performer or Opcode's Vision. Deck II's MIDI support goes well beyond DigiTrax's, however: Deck II can import and play standard MIDI files, while DigiTrax can only synchronize its audio playback with that of a MIDI sequencer.

An AV to Enter

DigiTrax runs only on the 660AV and 840AV (and on NuBus-equipped Macs containing ARTA-compatible cards, such as Spectral Innovations' NuMedia card). Deck II also runs on Power Macs and on Macs with audio hardware such as Digidesign's Audiomedia II and Pro Tools systems. Deck II also works more smoothly with other audio tools, such as Digidesign's Sound Designer II software.

For professionals, DigiTrax is a second-place finisher to Deck II. But many amateur audio buffs, schools, and home-studio musicians may not need Deck II's advanced features, and they will appreciate DigiTrax's built-in equalizer and its support for lower sound-sampling rates. DigiTrax also costs less, retailing for $349 compared with Deck II's $399.

The Last Word

Audio- or video-production professionals will want Deck II's larger array of features. But if you're an amateur musician or a multimedia producer with more modest sound-recording needs—and if you have a Quadra 660AV or 840AV—consider DigiTrax. What it lacks in features it makes up for in simplicity and a lower price tag. At press time, Opcode Systems announced that it had acquired distribution rights to DigiTrax, although Alaska Software will continue to develop new versions. A native Power Mac version of DigiTrax is scheduled to ship in the first quarter of 1995.—JIM HEID

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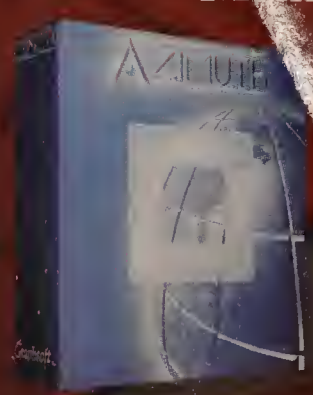

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Circle 46 on reader service card

Two MIDI Sequencing Programs

Music Software

Performer 5.02

PROS: Colorful, redesigned interface; improved sheet-music view; lucid manual. **CONS:** Copy protected; complicated setup; heavy hardware requirements. **COMPANY:** Mark of the Unicorn (617/576-2760). **LIST PRICE:** $495.

MW ★★★

Vision 2.08

PROS: Colorful, redesigned interface; endless-count-off feature; useful triggerable subsequences. **CONS:** Copy protected; complicated setup; heavy hardware requirements. **COMPANY:** Opcode Systems (415/856-3333). **LIST PRICE:** $495.

MW ★★★

THINK OF THE FAMOUS SOFTWARE rivalries, like QuarkXPress/PageMaker or FreeHand/Illustrator. With each successive upgrade, these programs become more complex, require more horsepower—and grow more alike. That's precisely the case with the two leading MIDI recording programs, Performer and Vision.

Their latest upgrades require 5MB of memory and a fast Mac (in addition to a synthesizer—or several—and a MIDI interface box). Each program offers a new or beefed-up editable sheet-music view. Both programs now have a groove-quantize feature that applies any of a folderful of rhythmic feels to your music (great for rap or driving-rock pieces, but of little value in other genres). Most significantly, Performer and Vision now offer almost identical menu and window layouts. There are tape-recorder–style transport controls in a floating upper window and, below the window, a list of tracks, complete with a measure-by-measure map of the composition.

Both feature lists have grown over the years. Both programs can lock onto SMPTE time code (for syncing with a videotape) and use Machine Control protocol to drive tape decks. On-screen faders let you create an automated mix for your piece. Both provide help mechanisms that are like balloon help but illustrated, and they work even in System 6. With either Performer or Vision, you can record music without the metronome, then tap in the beats afterward; the program generates the appropriate tempo and bar-line data automatically.

But not all of the similarities are glad tidings. As before, both programs are copy protected. If you want to avoid reinserting the key disk once per start-up, you must install the program on a specific hard disk—and remember to uninstall it before running a disk optimizer.

Worse, both programs now force you to use their own, mutually incompatible system extensions—OMS for Vision, FreeMIDI for Performer—plus an accompanying program that retrieves patch (instrument) names from your synthesizers. This software web is designed to accommodate the professional's multiinterface, multisynthesizer MIDI studio. For nonprofessionals, the extensions make installing and hooking up software an unforgettable, evening-long headache.

If your installation struggle succeeds, you gain one useful new feature. Whenever you record music into a track, you can choose an instrument sound for it from a handy pop-up list. You're spared the usual hassle of scampering from your Mac to your synthesizers to make their setups match.

Something Borrowed, Something Purple

Vision's new design parallels Performer's. In the case of the new track-overview window, that's good news—it's far more intuitive than the previous segment-centric organization of your music. You can now (at last) rearrange tracks by dragging them. Tiny Performeresque menus, containing commands unique to each window, now grace every title bar.

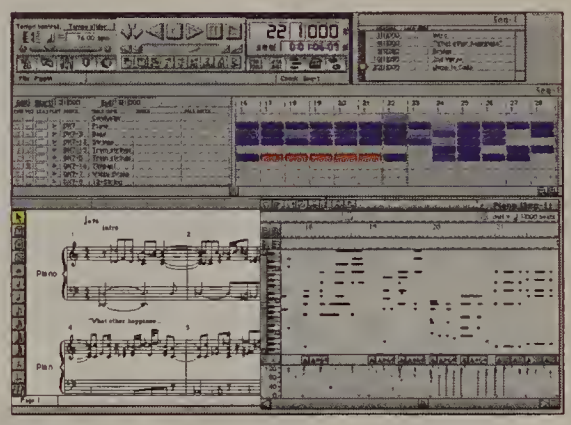
Vision, like Performer, now offers a standard-notation editing view. The manual's disclaimer "Vision is *not* a music notation application" hints at the disappointments to come: what you get is barely readable as sheet music. It suffices to help you find wrong notes and recognize chords, but it's certainly not useful enough to print out.

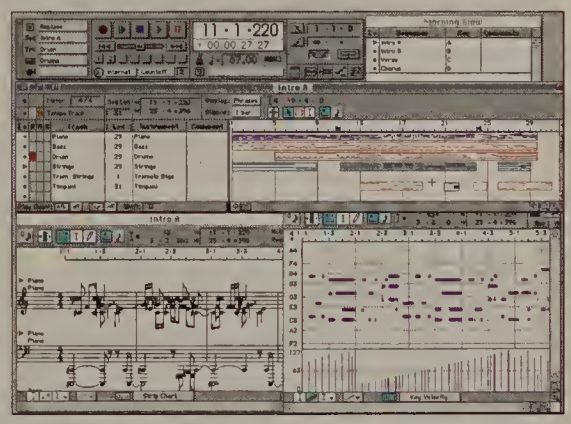
On the other hand, Performer now sports several features formerly found only in archrival Vision. For the first time, the program makes use of color—in some places, good use, as when darker shades of purple indicate denser music in the measure overview.

But Performer's notation view is so improved it's almost a brand-new feature. With a single click of the mouse, the tracks of your choice appear as sheet music laid out on a page, complete with beaming and stemming. Thanks to a visual-only quantizing scheme, the notated music instantly becomes more readable than a literal transcription would be. However, even Performer is not a notation program; for example, there's no way to add repeats, articulation marks, or even slurs. But it's a glorious way to edit your recordings. And in a pinch, for simple music, you can use Performer's printouts as sheet music.

Personality Split

Despite their identical-looking spec sheets, Performer and Vision still have distinct personalities. The interiors of Performer's windows, part of the program's sleek, three-dimensional graphic design, are now light gray. Together with Performer's use of tiny type, text boxes, and check boxes, the tinted windows give the program a precise, heavy, almost Wagnerian feel.





Musical Windows Similarly arrayed Performer (top) and Vision windows displaying the same music. Clockwise from top left of each window: the control strip, list of markers (subsequences in Vision), measure overview, piano-roll view, sheet-music view, and track list.

Performer's piano-roll editing view is still superior to Vision's; only in Performer can you adjust the height of the strip chart (where you can paint in values for tempo, pitch bend, key velocity, and so on, as a graph over time). Performer also offers the profoundly useful

continues

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Circle 78 on reader service card

Solo button, which lets you hear one track clearly while all others play at half volume. Performer's tape-recorder metaphor is arguably easier to learn than Vision's, too. This head start is amplified by Performer's well-written main manual—but is diminished by the continuous busy signal of Mark of the Unicorn's technical-support line.

Vision, whose interface feels bright and airy, offers some exclusive goodies of its own. Among them is the indispensable scrubbing feature: you hear the music as you drag across it. Another plus is the eternal-count-off feature: when you want to record, Vision clicks its metronome indefinitely and begins recording only when you start playing. You don't have to come in after a specified number of beats. And only Vision has play quantization, which cleans up your recorded rhythmic inaccuracies during playback, but preserves the original recorded data.

Finally, Vision remains the superior control center for live musical performance. You can adjust the tempo by tapping a computer key as the music plays. And Vision's subsequence feature allows you to compose an infinite number of musical building blocks within a single Vision file. Each subsequence plays when you press a letter key on your Macintosh keyboard. You can easily experiment with different arrangements of a song's sections, simply by typing, say, *AABAC*. Or, in live performance, you can play a vamp (a repeated introductory phrase) over and over again by typing *AAAA* . . . until the performer is ready to begin—and only then trigger the first verse (by typing a *B*).

The Last Word

Except for their annoying system extensions, both programs easily merit buying the upgrade; version 5 is the most worthwhile Performer overhaul in years, and Vision 2's new interface makes the program vastly simpler to grasp than its predecessor. However, neither program is likely to create much of an exodus from its rival's existing ranks of users.

And if you've never used either program? If Performer's sheet-music view appeals to you, your decision is made. Otherwise, Vision's list of exclusive, creativity-slanted features, such as endless count off, scrubbing, and subsequences, give it the usability edge. Both programs are complex, have minor bugs, and come with nearly unreachable technical-support staffs. Learn to tolerate those downsides and you've got your choice of fantastically powerful tools ready to bring your musical ideas to life.

—DAVID POGUE

Brainstorm Accelerator for the Macintosh SE

Upgrade Kit

PROS: Increases SE performance by two to three times; easy to install; stable. **CONS:** Costly relative to resale value of SE; precludes other slot-based expansion; limited to built-in video and 4MB of RAM. **COMPANY:** Brainstorm Products (415/988-2900). **LIST PRICE:** $199; for education market $129; 25 units or more $99 each; installation kit $19.

MW ★★★★

SOMETIMES, THE LESS SAID ABOUT a product, the better. In the case of the Brainstorm Accelerator for the Macintosh SE, that's praise. This upgrade does precisely what it should: make your SE faster and otherwise remain invisible. In this day of the Power Mac, accelerating an SE might seem absurd. Yet many SEs still lead serviceable lives in schools, homes, nonprofit organizations, and small offices, for which acceleration may be more practical than replacement.

The Brainstorm consists of an accelerator card that fits into the SE's expansion slot, and a Brainstorm Bus Accelerator (BBA) chip. The card contains a 16MHz 68000 processor—twice the speed of the SE's stock 8MHz 68000.

The unique part of the Brainstorm package is the BBA. It replaces the SE's 8MHz bus controller with a proprietary 16MHz chip, increasing the speed with which data shuttles between memory and SCSI peripherals (such as hard drives) on one side, and the processor on the other. The result is an SE that approaches a Classic II in overall performance.

Installation is only slightly more complex than with card-only accelerators. A novice can do it in 15 minutes. You remove the logic board from the SE and use a chip extractor to remove the SE's bus controller. Then just snap in the BBA, plug in the card, and reassemble the SE.

The installation kit comes with all you need to install the Brainstorm, including a well-written and well-illustrated manual. The user's guide for the Brainstorm is also clear and informative, with tips on troubleshooting and generally getting the most from your SE. All the code necessary to support the Brainstorm is in firmware on the card, which you can update via floppy disk. That's it: no extensions, no patches. Clean.

Performance

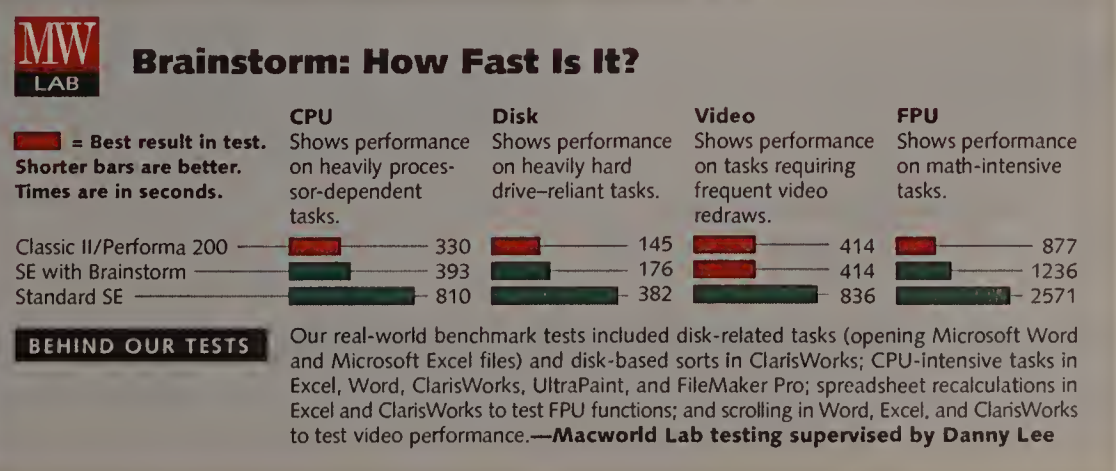
The company claims that the Brainstorm not only more than doubles the SE's speed but outruns competitive 68030-based accelerators. Benchmarks and Macworld Lab's real-world tests confirm that these are no idle boasts.

I had no compatibility problems—something I can't say about most 68030-based SE accelerators I've tested. Unlike the Brainstorm, some of those units support a floating-point unit (FPU), an external monitor, and/or up to 16MB of RAM. Then again, they're more expensive—and, tellingly, most of the companies that made them are now out of business.

Brainstorm's $199 price isn't much lower than the net cost of selling an SE and buying a used SE/30, a faster and more expandable Mac. Still, weighing the bulk discounts on the accelerator against the difficulties of buying used gear in quantity, the Brainstorm is a winner for those who have a large investment in SEs.

The Last Word

Even with a Brainstorm, your SE will never be a Power Mac, or even a IIsi. But if you're happy with your trusty SE save for the speed, and your budget won't buy a new Mac, you couldn't do better than the Brainstorm.—PETER M STOLLER



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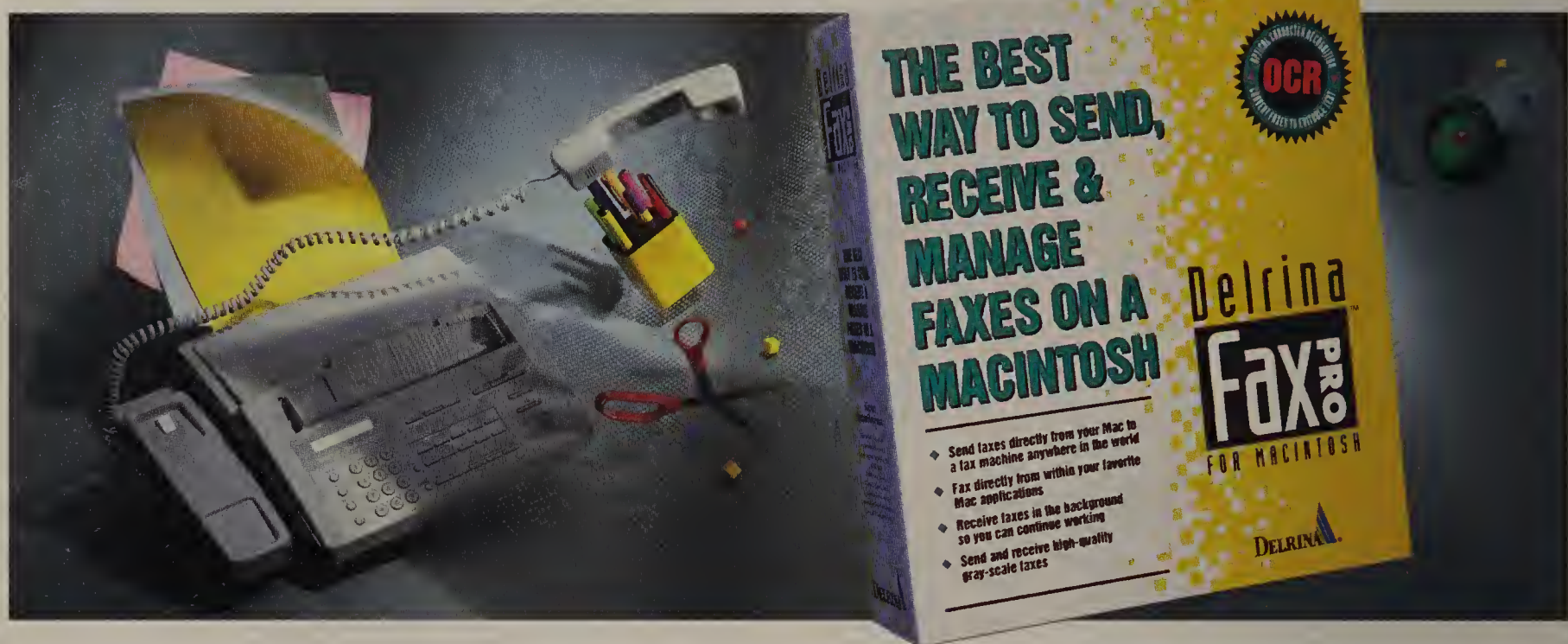

Now you can use your Mac to send, receive and manage faxes – thanks to new Delrina Fax PRO for Macintosh.

With Delrina Fax, sending faxes is as easy as printing a document – and you can fax directly from any Mac application. Simply select Delrina Fax in your File menu, type in a name and number – or choose a name from the built-in address book – then click on the "Send" icon and your fax is quickly on its way.

Don't try this with a fax machine.

Delrina Fax also delivers stunning 16-shade gray-scale sharpness and clarity on-screen, as well as to any fax machine or printer. And, since it works in the background, you can send and receive faxes without leaving the application you're working in and designate faxes to print automatically on receipt.

Delrina Fax automatically keeps a detailed log of all the faxes you send and receive, and it has built-in Optical Character Recognition (OCR) that lets you easily convert your faxes with text into documents that are ready to be edited. There's even a custom scheduling feature that allows you to schedule long distance faxes when phone rates are lower.

Delrina Fax gives you detailed information about your faxes. Viewing, printing, resending and deleting faxes are a mouse-click away.

Support that can't be beat.

Delrina Fax supports all fax modems for the Mac, as well as all Powerbook Express™ modems and AV GeoPort Telecom™ adapters. And installation is virtually automatic.

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Circle 137 on reader service card

Two Translators

Foreign-Language Translators

French Assistant for Macintosh 1.0

PROS: Easy to use; has interactive option; opens most files; prints out source text sentence-by-sentence with translated text; inexpensive; decent documentation. **CONS:** Slow; limited lexicons. **COMPANY:** Globalink (703/273-5600). **LIST PRICE:** $59.95.

MW ★★★

Power Translator for Macintosh 2.0

PROS: Zippily produces first-draft translations; easy to use; over 250,000 entries in dictionaries; allows multiple-word entries. **CONS:** Memory hog; no interactive option; opens only ASCII files; cannot print translated text juxtaposed to source text. **COMPANY:** Globalink (703/273-5600). **LIST PRICE:** $249.

MW ★★★

EVEN WITH BRILLIANT PROGRAMming and extensive lexicons, language-translation software cannot equal the skill of a person who is multilingually fluent. Language is too complex, subtle, and occasionally illogical for that. What software can do, at best, is accelerate producing first-draft translations that need minimal editing; at worst, it bogs down that process.

Power Translator 2.0 (PT) addresses general translation needs of students and professionals. In a recent merger with MicroTac Software, Globalink acquired the low-end Language Assistant series, targeted at casual users with limited requirements. The company's high-end Power Translator Professional ($595; not reviewed here) offers multiuser network access to the translating engine and optional add-on dictionaries covering subjects such as business, finance, and computers. Language Assistant is available for French, Spanish, German, and Italian; Power Translator, for French, Spanish, and German. This review is based on French Assistant (FA) and the French versions of PT.

Lexical Logistics

FA's bilingual dictionaries each contain about 100,000 single-word entries; PT's lexicons boast more than 250,000 entries, including phrases. Both programs let you alter dictionaries; any additions or changes you make are saved to a separate file that the program seeks first when it runs a translation.

When adding entries, you must enter certain lexicographical information, such as part of speech, case, and gender. For example, when adding an adjective in FA, you choose from a list of adjectives, each of which models a unique inflection rule—the feminine form of *joli* [*pretty*] is *jolie*, for example. (FA omits the less-common model that *fraîs* [*cool*] follows, becoming *fraîche* in the feminine.)

FA's inflection tool provides conjugations for over 3000 verbs in all but the rarest tenses, and FA's manual includes a helpful chapter on English grammar (lacking in PT's generally weak manual). But PT has perhaps the most useful translation tool: a semantic-unit dictionary, which allows you to add definitions for idiomatic phrases.

Automatic Translating

To translate a document in FA, you choose New English Project (English to French) or New French Project (French to English) under the File menu. PT, on the other hand, is really two applications—English–French and French–English—that operate from a common set of dictionaries. To begin translating you choose one or the other; because each application requires such an enormous amount of operating-system resources and RAM, you'll crash if you try opening both at once.

When you begin a translation in PT, an oversize Untitled document appears (needlessly occupying most of the width of a 17-inch monitor). You open the desired file or paste text in, select the text you want to translate, and choose the Translate command located, oddly, in the Special menu. PT then displays the source text and the translated text side by side in two smaller windows.

FA shows the source text above the translated text in two halves of one window. You can type in the window, but it's much faster to import files. FA reads text-only, MacWrite, ClarisWorks, Microsoft Word, and WordPerfect files; PT opens only ASCII files (to open a Word file, you must save it as text-only), though Globalink plans to rectify this. In either program you can paste in text via the Clipboard. Both let you format and print out translations, but FA niftily lets you print out source and translated text juxtaposed and numbered, sentence by sentence.

FA can translate a whole document at once or one sentence at a time. In my tests, both of these options yielded nearly incomprehensible translations, with French-to-English results only slightly better than the reverse. The interactive mode, whereby FA pauses on words that have multiple meanings and you select the best one, is more accurate but dreadfully slow. And alas, FA's dictionaries often lack the desired definition.

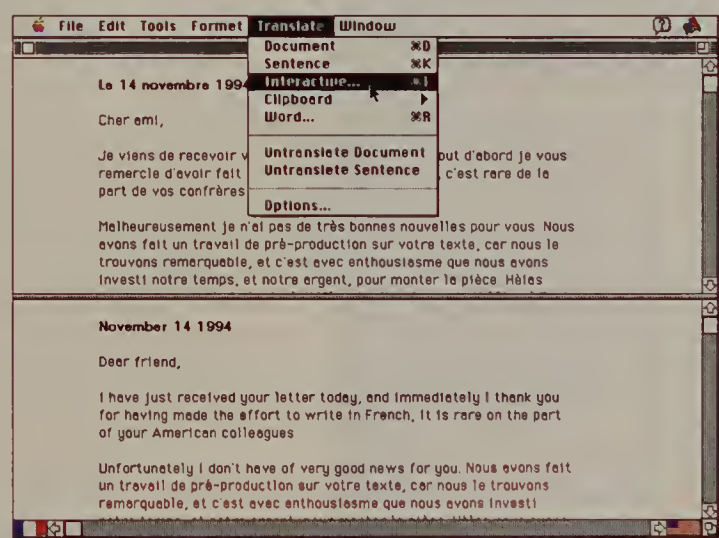
PT, in contrast, can only translate an entire document at once, though you can pause a translation midstream and update the window. Puzzlingly, PT also features English audio output, which allows you to hear your English translation in electronically eerie enunciations. (Globalink plans to include both interactivity and foreign-language voice output in a future release of PT.)

Requirements and Results

Although FA's documentation calls for a 68030 Mac with 4MB of RAM and System 7.0, Globalink's tech support concedes that you should have at least a 68040 Mac, 8MB of RAM for either FA or PT, and 15MB (FA) or 30MB (PT) of hard disk space. Translating a 200-word French paragraph into English took 6 minutes when I used a Power Mac 6100, and a 1500-word French article from the magazine *Beaux Arts* took over 44 minutes—a snail's pace of about 34 words per minute. Globalink says FA's lethargy derives mainly from its need to execute several lookups for every word.

There's no doubt about PT's speed advantage, thanks mainly to its built-in

continues



Interactive Translating French Assistant's slow but more accurate Interactive option lets you choose the correct definition for words that have multiple meanings.

Before you buy a color printer, you'd better double-check your facts.

STANDARD FEATURES

	PROFESSIONAL COLORPOINT 2 MODEL 4/14	TEKTRONIX PHASER 440/480
DUAL TECHNOLOGY	✓✓	
ADOBE POSTSCRIPT LEVEL 2	✓	✓
33 MHZ RISC PROCESSOR	✓	
135 ADOBE TYPE 1 FONTS	✓	
AUTO TRIM (Automatically cuts paper/OHP)	✓	
INTERNAL HARD DISK (No additional RAM needed)	✓	
4-COLOR FULL-BLEED PRINTING (Right out of the box!)	✓	
INDUSTRY-STANDARD COLOR MANAGEMENT	✓	
DCS FILE SUPPORT	✓	

Do the research and you'll discover that the Professional ColorPoint 2 is twice the printer of any of its competitors. It has all the features you want standard, so you can print full-bleed, 4-color pages right out of the box. Plus, with Seiko Instruments' unique Dual Technology, it's like getting two printers for the price of one.

Dual Technology means the Professional ColorPoint 2 can output both thermal wax transfer and dye sublimation prints. Use the thermal wax transfer mode to output inexpensive ad, collateral, and packaging comps, or rough drafts of brochures and presentations. Then switch to dye sublimation mode when you're ready to print high-quality, photorealistic final output. So instead of being tied to the higher cost of materials with a dye sub-only printer, you'll save thousands of dollars on supplies by using thermal wax transfer during your proofing stages.

Check it out for yourself. For free sample output and a brochure on how the Professional ColorPoint 2's Dual Technology can save you up to forty thousand dollars a year in output costs, or for a free demonstration, call **800-888-0817.**

SII
Seiko Instruments

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virtual memory and its inflection-lookup technique. Speed differences will vary depending on the Mac model and the document's length and complexity, but in my tests on the 6100/60, PT performed 14 to 18 times as fast as FA. PT translated the same 1500-word article in 2 minutes and 47 seconds—an impressive rate of nearly 540 words per minute, or 9 words per *second.*

PT's overall accuracy was only slightly better than FA's, and for some sentences FA actually produced the better translation. In a *Beaux Arts* article on the artist Robert Ryman, neither program recognized *tableaux* as *paintings* (FA read it as *blackboards;* PT, as *tables*), and neither produced the correct translation for "*il y a trois ans,*" or "three years ago" (FA yielded "there are three years old"; PT, "there are three years").

Translating simple clauses illustrates a degree of unreliability in both programs: for "*Le choc vient bien sûr d'abord du contraste des effets,*" FA offered "The shock comes of course first of contrasts some effects," and PT, "The shock comes of course d approach from the contrast of effects" (irksomely, PT doesn't recognize prevowel contractions such as *d'*, *s'*, *l'*, and *c'*, leaving the lone letters floating in the translation). My translation: "Naturally, the initial impact comes from contrasts between characteristics in the artist and in his work"—not literal, but unlike software it takes into account the context of the article. Staff members of the Alliance Française of San Francisco observed that FA and PT often misinterpret "easy, idiomatic writing" and have trouble linking words in the correct order and choosing the right prepositions (also true of the Spanish versions), and that PT seems to handle technical writing and advanced vocabulary better than FA does.

Clean source text—straightforward in style with unambiguous words, few idioms, and correct spelling (including accents) and grammar—always yields a superior translation. Neither FA nor PT is meant for the lofty milieu of literature and poetry (you don't even want to know what the programs did to Proust).

The Last Word

French Assistant is too slow to be useful except to help you translate short documents such as business correspondence (using an 040 Mac or better), though the next release may be faster. If you frequently need to translate long business or academic documents, consider Power Translator: it won't free you from consulting paper dictionaries or editing, but it's likely to save you time creating a first draft.—JACQUELINE KAN

StuffIt Deluxe 3.5

Compression Utility

PROS: Excellent selection of compression tools; good efficiency and speed. **CONS:** SpaceSaver utility requires a large amount of RAM.
COMPANY: Aladdin Systems (408/761-6200).
LIST PRICE: $129.95.

MW ★★★★

VERSION 3.5 OF STUFFIT Deluxe brings Power Macintosh acceleration, easier ways to compress files, and tighter compression.

The StuffIt Deluxe application allows you to create or decompress archives. The StuffIt format is an industry standard and is widely used by online services. StuffIt Deluxe is compatible with many other programs. The program offers extensive AppleScript support and comes with sample scripts for AppleScript and UserLand Software's Frontier. It is both scriptable and recordable, and the manual details the available scripting commands. The package also includes Stuff and Unstuff extensions for CE Software's QuicKeys and for Claris's XTND file-conversion scheme, and you get a stack with XCMDs for HyperCard. The company claims that the package is PowerTalk-compatible, but I did not test this feature.

The revamped StuffIt SpaceSaver is a control panel that transparently compresses files and folders on your hard disk. The compressed items keep their original icons, and you work with them as you would if they were not compressed. SpaceSaver can compress automatically when your computer is idle or upon receiving a command from Magic Menu, located in the Finder. (Magic Menu also creates and decompresses StuffIt archives.) SpaceSaver makes compression and expansion easy in other ways, too. You can set SpaceSaver so it triggers when you change the name of a file. To turn a file into a StuffIt archive and delete the original file, you simply add **.sit** to the end of the file name. SpaceSaver occupies approximately 475K of memory, which can be inconvenient.

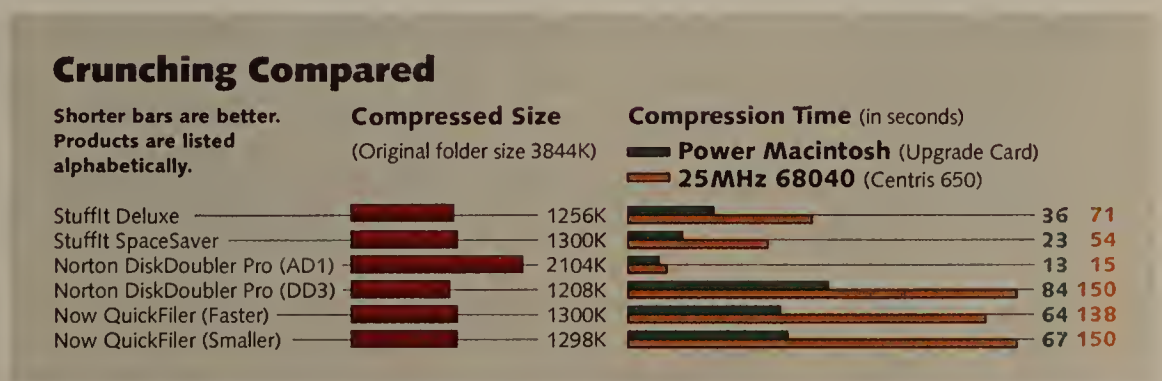
The package is now accelerated for Power Macs, and the conversion to native mode boosts StuffIt Deluxe's speed significantly. On average, the program compressed twice as quickly using a PowerPC processor compared with a 68040. Compression efficiency was good; a 3844K folder of applications and documents squashed down to only 1256K.

Aladdin includes several utilities that it offers as shareware or freeware. StuffIt Expander is a drag-and-drop application that decompresses StuffIt archives as well as several other types of compressed archives. DropStuff with Expander Enhancer lets you create StuffIt archives by dragging files or folders onto the DropStuff icon. DropCompress works the same way but compresses using the SpaceSaver method. DropConvert converts archives from other compatible compression utilities to StuffIt Deluxe format; it also converts earlier versions of StuffIt-compressed files to the current version. Owners of Aladdin's commercial packages are automatically registered for the included shareware and need not send in a separate shareware fee.

StuffIt Deluxe is the best compression package for net surfers because of its built-in translators for BINHEX4; Compact Pro; the DOS ARC and ZIP formats; and the Unix btoa/atob, tar, uuencode/decode, and Unix Compress formats. (StuffIt Expander can also handle these formats, except tar and btoa/atob.) A few notable formats are beyond StuffIt Deluxe's reach, however: none of its utilities can expand files compressed with competing products from Symantec (DiskDoubler) or Now Software (Now Compress and Now QuickFiler).

The Last Word

StuffIt Deluxe gives you a better range of compression tools than does Norton DiskDoubler Pro and costs only a little more. Aladdin's drag-and-drop applications, Magic Menu, and file translators make it easy to integrate compression into your routine. If you are looking for a compression solution, you should look at StuffIt Deluxe.—TOM NEGRINO



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*Official 1993 Monitrak U.S. monitor sales research.

Circle 38 on reader service card

QuickCam

Digital Video Camera

PROS: Tiny; fun to use; inexpensive. **CONS:** Needs better frame rate for larger window sizes. **COMPANY:** Connectix Corporation (415/571-5100). **LIST PRICE:** $149.95.

MW ★★★★

CONNECTIX CORPORATION, ALREADY known for its strong utility software, has introduced another winner with its first hardware product, the QuickCam. The QuickCam is a 4-bit, gray-scale (16 shades) video camera that's slightly smaller than a billiard ball. (Connectix expects to ship a color version in early 1995.) Although not a serious contender as a videoconferencing camera, for as little as $99 (street price) the QuickCam lets users experiment with video input for making QuickTime movies or capturing still video images.

The QuickCam weighs a mere 3.3 ounces and tethers to your Mac with a 5-foot serial cable that also supplies power to the camera (less than 2000 milliamps of current). Inside the QuickCam is a fixed-focus lens (18 inches to infinity at f 1.9), a single CCD (charge-coupled device), and a microphone.

The QuickCam is the first digital-to-digital video camera. It captures video as digital data and sends it directly to your Mac via the modem or printer port. As a result, it needs no additional hardware to digitize video. This represents a major advantage over other cameras that require some sort of analog-to-digital conversion, usually done through a card such as the VideoSpigot or through an AV Mac.

Unfortunately, the QuickCam's performance is constrained by the bandwidth of the serial port. The maximum window size the QuickCam can capture at 15 frames per second (fps) is small—only 120 by 160 pixels. You can get a 320-by-240-pixel movie, but your frame rate drops to 7 or 8 fps at best. On an 040 Mac you can still achieve a decent 15 fps on a 120-by-160-pixel window with sound, but only if the sound is captured through the Mac's microphone jack and not through the QuickCam. Your frame rate will drop slightly if you capture sound through the QuickCam's internal microphone.

One caveat: the 500-series PowerBooks do not generate enough power for the QuickCam to produce an image, and users of those machines will need to purchase a flow-through ADB cable ($9.95), which supplies additional power. However, then PowerBook users can run the QuickCam off their machines, rendering it a portable digital camera that can be used anywhere. Imagine creating your own in-flight movie!

The QuickCam comes with a basic, easy-to-use QuickTime recording application, called QuickMovie. With QuickMovie you can record; cut and paste; and adjust volume, brightness, frame rate, and compression. The manual does a good job of explaining all the possible settings and their effects on your final movie. QuickMovie also supports two special frame rates: One Frame at a Time and Time Lapse. With One Frame at a Time, you can take individual snapshots and assemble them into a QuickTime movie just by clicking the mouse button. With Time Lapse, you can record single frames at specified intervals—a nifty feature if you'd like to monitor the area around your desk.

KEVIN CANDLAND

Also included are a desk accessory and a stand-alone application: QuickPict (the desk accessory) allows you to take single shots without launching QuickMovie, and QuickFrame is an electronic photo album in which you store and view the shots you've taken. For more fun, you can drop QuickSaver, an After Dark–compatible screen-saver module, into your Control Panels folder. This module allows you to play the video that's being captured by the camera in real time as a movie, as well as use the still pictures as various desktop backgrounds.

The Last Word

The QuickCam isn't in the same league as the more-serious digital cameras, such as VideoLabs' FlexCam (see *Reviews*, December 1994): the limited bandwidth of its serial connection and small video-window size make it unsuitable for videoconferencing. However, as a low-cost, gray-scale camera, it's great. It's tiny, fun, easy to use, and incredibly inexpensive, and you can even run it from your PowerBook.—DANNY LEE

Bookends Pro 3.1

Reference-Creation Tool

PROS: Speedy performance; handy formatting, search, and automatic reference-creation features. **CONS:** Lacks online help; minor quirks. **COMPANY:** Westing Software (415/435-9343). **LIST PRICE:** $129.

MW ★★★★

BIBLIOGRAPHIC REFERENCES ARE THE bane of a writer's existence. I have a collection of them on handwritten notes, laser printouts, photocopies, books, and magazines, all in a cluttered pile, and many researchers and writers can probably say the same. Anytime I write a manuscript, there may be dozens of references I need to sort out. For folks like me, Bookends Pro from Westing Software is a dream come true.

Bookends Pro is a comprehensive database program that catalogs and stores all of your reference material—actual quotes as well as citations. You can enter your references via the keyboard directly into the program's data entry window, or import them from other sources, such as a tab-delimited text file, or an online technical database such as Compact Cambridge or the Illinois Bibliographic Information Service. The program can also search a word processing document for citations and bring them into its database.

In addition to maintaining a database of all your reference information, Bookends Pro offers a rich set of search tools, so you can quickly and easily locate the references you need and copy them into your document.

The program's interface is very much like a HyperCard stack, complete with a handlike pointer. Menu-bar commands, buttons, and pull-down menus are all clearly labeled as to function, but there is no online help to guide you through rough spots, not even balloon help. To get up to speed with Bookends Pro, you should keep the manual on hand, and follow the tutorial chapter carefully before you build your own reference database.

Once you create your database, Bookends Pro makes easy work out of incorporating your references into your manuscript. The search tool can look up a reference based on categories such as author name, source, or date of a reference, as well as text within an abstract that you've entered or imported, or from a list of keywords that you can establish for each entry. Once you locate the reference

continues

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Circle 249 on reader service card

you want to use, you can copy the citation in your database, then paste it into your word processing document.

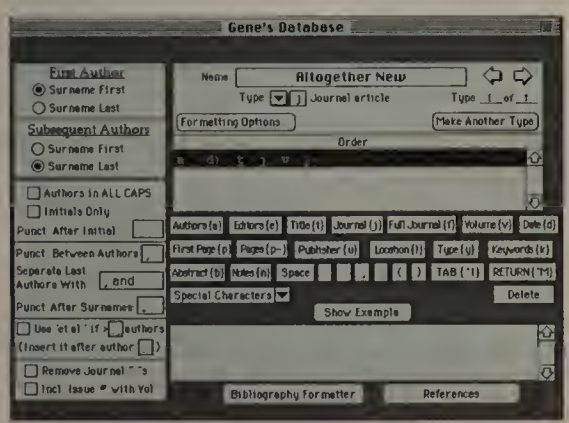
Bookends Pro supports most popular word processing formats, so it's easy to bring formatted text into your document. You can choose from over 90 standard reference styles or create one of your own. In addition to creating fully formatted footnotes and endnotes, the program can build a full bibliography based on the entries you select. A hot-links feature lets you quickly switch to Bookends Pro from a word processing program (if it's open), by pressing a predefined keyboard command and clicking on a "hot spot" corner you establish on your Mac's screen. The shortcut doesn't work for the return trip to your word processor, however.

The program is a little slow to get going if you have a large font library (it took about 50 seconds to launch on my Power Mac 8100/80), but once under way it runs speedily and reliably. One notable quirk: When you close your database, the program tells you if you need to compact it. You can also compact the database via the File menu. Also, the program doesn't highlight search "hits" within a database entry. This is not a problem if your search string contains just titles, author names, or keywords, but if your match is part of a long text abstract, you may waste time reading through the material to find out what the search string located.

If you run into trouble, technical support for Bookends Pro is a toll call (the manual gives you a toll-free number, but it refers you to a regular phone number for support). The technical support staff is courteous, patient, and very knowledgeable about the nooks and crannies of the program.

The Last Word

Bookends Pro can do wonders to bring order to your reference material. Although you have to keep the manual handy till you get the hang of it, it is a useful tool that all researchers and writers will appreciate.—GENE STEINBERG



Reference-Format Options You can choose from over 90 reference formats or create a style of your own in this handy format-editing window.

Security Programs

Security Software

DiskGuard 1.0.1; DiskGuard Remote

PROS: Rock-solid hard drive protection; flexible installation options. **CONS:** Minor bugs; does not work on drives compressed with driver-level compression software. **COMPANY:** ASD Software (909/624-2594). **LIST PRICE:** Single user $129; remote five-pack $449; ten-pack $799.

MW ★★★★

DISKGUARD AND DISKGUARD Remote from ASD Software are flexible tools that help you protect your valuable data from prying eyes and theft. The programs work at the disk driver level (so you cannot defeat the programs by using another start-up drive or floppy disk), and you can set them to protect either an entire hard drive or individual partitions on a drive.

DiskGuard functions are controlled through a control panel. You can establish passwords and privileges on two levels. The system administrator uses the master password. A separate user password customizes the protected disk for use by anyone else. You can restrict user access to certain days of the week, or to a specific time frame on those days. You can also limit a password to a given number of days, after which it becomes invalid and the system administrator must reestablish it. And you can prevent users from creating new passwords.

Flexible Installation Options You can set all of your disk-protection choices using the DiskGuard control panel.

Other DiskGuard features include a screen-lock capability, which puts up a screen saver after a specified interval of inactivity. Once the screen saver activates, users need to type a password to wake up the computer. Additional security options prevent users from saving files to the protected disk and prohibit floppy disk insertion. These features make DiskGuard especially useful if a Mac is used in a classroom or is on public display (for example, at a store or a trade show).

DiskGuard is not just a business-related tool. If you have children around the home who want to use your Mac, you can exert your parental rights by giving them a user password and configuring DiskGuard to make your Mac available to them only during the days and times you want. I've taught my nine-year-old son to use his password to gain access to his dad's computer at the agreed-upon hours so he can play his favorite games.

DiskGuard is serialized for use on a single Mac. If you want to install DiskGuard on more than one Mac, you'll need to purchase DiskGuard Remote.

DiskGuard Remote

DiskGuard Remote, which comes in five- and ten-user packs, extends the same levels of disk protection across your Mac network. The network version of the program includes two installer files: one for the network administrator, the other for users. The network administrator can establish separate levels of user access to individual Macs on a remote basis. Updates to DiskGuard software can also be done at the network level.

DiskGuard Remote adds a Set Clock feature that allows you to synchronize the clocks of all networked Macs. Since Mac clocks always seem to be a few seconds off, administrators need to run this procedure periodically; clocks do not adjust automatically.

The versions of DiskGuard and DiskGuard Remote that I tested do not support the IDE drives used in some entry-level Macs, such as the Quadra or Performa 630 series and the PowerBook 150. (An update, due to be released by the time this review is printed, should include support for these drives. ASD Software also promises to offer individual folder-level protection in a future release.)

I was able to isolate one direct conflict with the DiskGuard control panel. A popular freeware utility called Appli-Windows (which allows you to hide application windows automatically when switching to another application) stopped working when I installed the DiskGuard control panel. I was able to resolve this conflict by changing the start-up loading order of the two extensions (so DiskGuard loaded first).

The Last Word

I found DiskGuard and DiskGuard Remote to be rock-solid, flexible disk-protection tools. If your Mac or Macs are accessible to others to whom you don't want to expose your valuable data, you should seriously consider these products. —GENE STEINBERG

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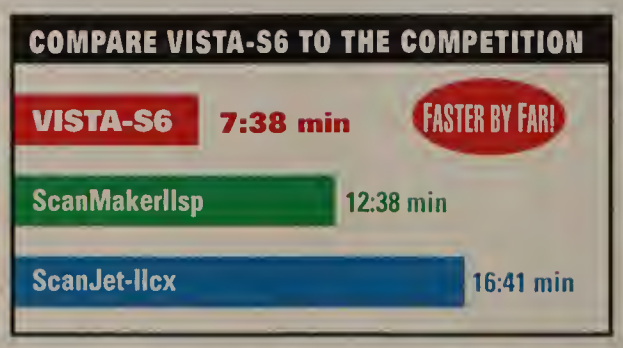

Letter size scan, 24 bit color, 300dpi, approx. 24MB image.
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Panelight ZX

LCD Panel

PROS: Excellent color quality; relatively inexpensive. **CONS:** Clarity could be better. **COMPANY:** Panelight Display Systems (415/772-5800). **LIST PRICE:** $3995; with video option $4695.

MW ★★★★

PRESENTERS ON THE GO CAN CHOOSE from a variety of technologies and products. Using presentation hardware can be complicated and stressful if it malfunctions or you forget a crucial adapter. But if the equipment is reliable and easy to set up, a great presentation is almost guaranteed.

The Panelight ZX is an active matrix LCD panel intended for use with an overhead projector in presentations. Setup is simple, and the ZX requires no software; it plugs directly into a Mac's video port using a VGA-to-Mac adapter. The ZX's 8.4-inch-diagonal screen is appropriate for smaller groups; if you need to present to more people, consider a panel with a 10.4-inch-diagonal screen—it produces a larger image.

Colors on the ZX are clear and bright. The panel I tested displayed flesh tones, bright colors, and text accurately. But a panel's image quality is inevitably affected by the projector providing the illumination. Macworld Lab tests have shown that overhead projectors tend to be dimmest in the upper left-hand corner of the image. This often means that menu bars are difficult to read, and this was the case with the ZX. A problem related more specifically to the ZX panel was the appearance of faint diagonal lines, which were more noticeable when I displayed a static single-color image.

The video-capable ZX displays NTSC, PAL, SECAM, or S-Video, and plugs directly into a video source. Video displayed on the device from a laser disc player looks smooth and flicker-free. If you don't need this functionality right away, you can buy a data-only version from Panelight for $700 less and add the video capability later.

The lightweight panel can display a maximum of 1.4 million colors, but the actual number of colors it will display depends on the number of colors your Mac can project, which in turn varies if you've added VRAM or a graphics accelerator card.

A panel displaying a washed-out or too-bright image may simply need adjustment, which you can make on the ZX through the included remote control. The small, pleasantly uncomplicated remote works well.

The ZX lacks the built-in speakers that some other panels offer, but in the panels I have tested, the speakers are often of mediocre quality, so I didn't miss their absence. If you want to play high-quality audio during your presentation, bringing your own speakers is your best bet.

KEVIN CANDLAND

The Last Word Panelight's excellent, toll-free technical support makes up for the anemic five-page manual. Manufactured for Panelight by nView Corporation (which won an Editors' Choice award for its Z115 in *Macworld*'s January 1995 article on LCD hardware, "Portable Presenters"), the ZX offers vivid images at a comparatively low price. It's a great choice for those peripatetic presenters.—JOANNA PEARLSTEIN

ACT 2.0

Contact Manager

PROS: Customizable contact fields; maintains contact history; integrated word processor. **CONS:** Fixed-size calendar windows; scheduling functions more limited than some calendar programs. **COMPANY:** Symantec Corporation (503/334-6054). **LIST PRICE:** $249.95.

MW ★★★

ACT IS A DATABASE PROGRAM DESIGNED especially for people who need to track information about their business contacts. With over 70 contact fields to choose from, ACT can handle just about any type of personal data you can throw at it.

You can relabel or hide any field in ACT's detail view, but you can't customize the layout or display font. To help avoid data entry errors, you can define sets of alternative values called Pick Lists; as soon as you've typed enough characters to match an item from a list, ACT enters that item into the field. Unfortunately, you can't tell ACT to add items to a Pick List automatically when you type something it doesn't recognize, such as a new city or state.

ACT provides a suite of functions to help you initiate and track contact-related events. For example, it can dial a phone number for you, time the call, and mark it as attempted or completed. ACT records phone calls in a contact's history file along with meetings and to-do items, so it's easy to check the last time you called a given person. You can compile a list of frequently called numbers for rapid access, but unlike Now Contact's QuickContact, ACT does not let you dial numbers from the list while you're working in another application.

ACT lets you display or print detailed reports using its built-in word processor. While not nearly as comprehensive as dedicated programs like Microsoft Word, ACT's word processor does offer basic text formatting—including a spelling checker—and also lets you create letters, fax cover sheets, and envelopes. (Users with PowerTalk-equipped Macs can send and receive E-mail messages without quitting ACT.)

Limited View The small squares in ACT's monthly-calendar window don't leave much room for event text.

Calendar events—phone calls, meetings, and to-dos—must be tied to specific contacts, and ACT's scheduling dialog is as quirky as ever. For example, the program blithely accepts "2/56/95" in the date field, interpreting it as "2/1/95." ACT does support recurring events, but not as flexibly as do some other schedulers; you can't, for instance, book a meeting for the third Thursday of every month. And while ACT does let you schedule activities without a specific start time, there are no undated to-do items. Finally, ACT doesn't support special events like holidays at all.

I was also disappointed that Symantec has not remedied one of the previous version's most annoying deficiencies: all three calendar windows remain at a fixed size, and you can't view more than one at a time.

The Last Word ACT 2.0's reference guide is alphabetical, an approach I find cumbersome. But the online help is thorough and well implemented, and Symantec provides 90 days of free tech support (but not toll-free). ACT's file-level compatibility with DOS and Windows and its complete contact management make it worth considering if you can live with its weak scheduling functions.—FRANKLIN N. TESSLER

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MacDraft 4.0

2-D CAD Software

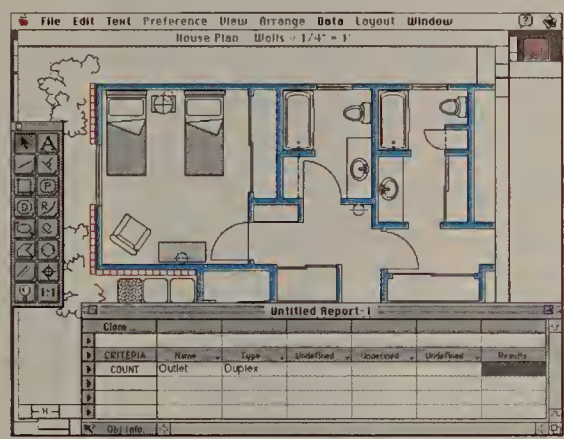
PROS: Improved editing features; new database with automatic reporting to Excel. **CONS:** A bit slow; some DXF glitches. **COMPANY:** Innovative Data Design (510/680-6818). **LIST PRICE:** $449.

MW ★★★★

INNOVATIVE DATA DESIGN (IDD) USED to sell MacDraft and a fancier product, Dreams, until the company simplified things by offering everything in a single MacDraft package. Several optional libraries of general-purpose and special architectural symbols might suggest a product oriented toward architects, but most MacDraft users are technical illustrators or engineers.

MacDraft 4.0 has an easy-to-use database that associates spreadsheet-style reports with each drawing. MacDraft can automatically log the number of each kind of object into a report for an inventory or a bill of materials. You can edit and print reports in MacDraft or clone report information directly into Microsoft Excel spreadsheets, where calculations about price, sales tax, and so forth, can help you decide how to bid on a project. Watch in terror as changes in a drawing result in a direct cash loss on a fixed-bid project, or smirk with glee as you improve the bottom line by simplifying materials. Database capability like this is found in Graphsoft's MiniCad but not in MacDraft's closest competitor, Blueprint 5.0, also from Graphsoft (see *Reviews*, *Macworld*, January 1995).

Blueprint, though, is generally faster than MacDraft. Rotating a whole 100K drawing on a Centris 610 took 3.7 seconds in Blueprint and 12.4 seconds in MacDraft; a horizontal flip took 3.2 seconds in Blueprint compared with 7.8 seconds in MacDraft. When I performed these operations on drawings translated from other sources, I found occasional problems reading Autodesk DXF files into MacDraft. The package comes with a long text file that explains how to prepare drawings in other programs for optimal import into MacDraft, and it's required reading. Both programs are acceptably fast, especially on more-powerful computers. IDD expects to release a Power Mac version of MacDraft in January.



Reporter at Large Report windows in MacDraft can count and list the objects used in a drawing, and you can hot-link report data to Excel.

MacDraft finally features floating tool palettes and also provides tools that let you build new objects by joining edges of existing objects or by cutting object sections. Tools for mirroring and duplicating objects, for offsetting objects to arcs and straight lines, and for exact positioning of objects across several layers fill out the tool set.

Resizing of objects is now under keyboard control—a great aid to precision in drawing special curves. Also, you can now call up symbol libraries (including ones you construct yourself) in their own little window inside a drawing; this feature neatly automates much of the drudge labor in large, complex drawings. All in all, this is a feature-set upgrade that really warrants the jump from version 3.0 to version 4.0.

The Last Word The report links to Excel and the clean interface make MacDraft an excellent choice for use in mechanical engineering and construction. Besides, it's probably the easiest real CAD program to learn.—CHARLES SEITER

Statistica/Mac 4.1

Statistical Software

PROS: Exceptionally complete suite of tests; fast; good statistical graphics. **CONS:** Minor Mac interface problems. **COMPANY:** StatSoft (918/583-4149). **LIST PRICE:** $695.

MW ★★★★

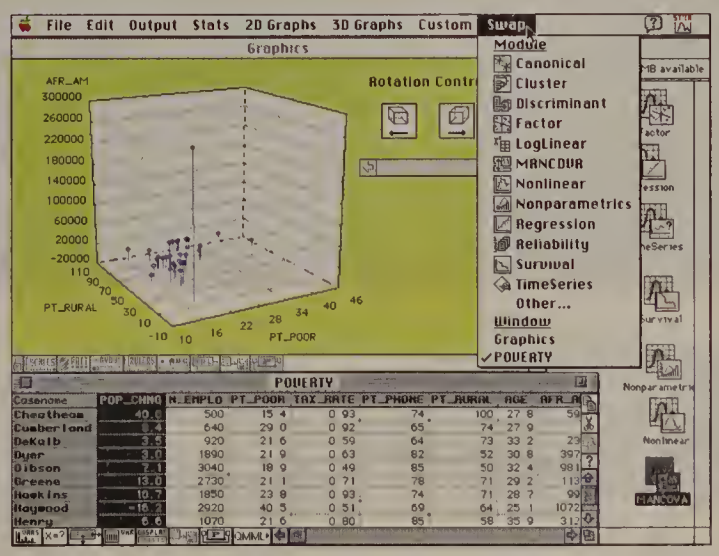
STATISTICA/MAC HAS ALWAYS HAD a large range of statistical tests; in version 4.1 it offers essentially the scope of the much larger and much more expensive SPSS suite. It's really convenient to get feature-rich time-series, reliability, survival, and cluster analyses all in the same package (Statistica provides different tests under the Stats menu, depending on the module you choose). These are extra-cost options for most other statistics packages—when they're available at all.

Statistica has always been fast, and now its performance is even faster, with genuinely dazzling speed on rotation of 3-D plots. The time-series module's Fourier-transform routine is essentially too fast to benchmark on typical data sets of only a few thousand points. It will be interesting to see what a native Power Mac version of this product (Stat Soft says one should be available in early 1995) could do with big spectral-analysis data sets, since the speed of the 680X0 version is exhilarating. Besides this, both 2-D and 3-D plots are attractively designed and can accommodate huge sets of points; Statistica had no problem with large sets (25,000 pairs of points) imported from a Spyglass test suite.

Little parts of Statistica still suggest that the core code was developed first in a non-Mac, non-SANE environment. You can open a data set and click on the Close box, but closing the data set is still an option under File. Whatever the logic, that's not how Mac software should work. The default scaling of axes in graphs can still produce surprises (see "Spinning the Numbers"). These are not major problems, however, and StatSoft's customer support for Macintosh users has greatly improved.

Since SPSS has acquired SYSTAT, the only real competition for StatSoft in the Macintosh marketplace is the newly redesigned SPSS Mac package, which, according to the company, should be available in January. Other Macintosh statistics products are either oriented more toward exploratory data analysis or are primarily graphics-based programs that don't attempt to compete on a feature-by-feature basis. The Statistica/Mac package offers a whole list of traditional tests that will be familiar to most graduates of college-statistics courses.

The Last Word I would rather use DataDesk or JMP for doing exploratory statistics and StatView for creating presentations, but at present Statistica/Mac 4.1 is the undisputed features-per-dollar champion in the Mac statistics market.
—CHARLES SEITER



Spinning the Numbers Why the z-axis in this Statistica/Mac graph runs down to –20,000 in reporting a population is anyone's guess, but this plot can spin at lightning speed.

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A.D.A.M. The Inside Story

Multimedia Anatomy Program

PROS: Stunning anatomic drawings and animations; entertaining; educational. **CONS:** None. **COMPANY:** A.D.A.M. Software (404/980-0888). **LIST PRICE:** $79.95.

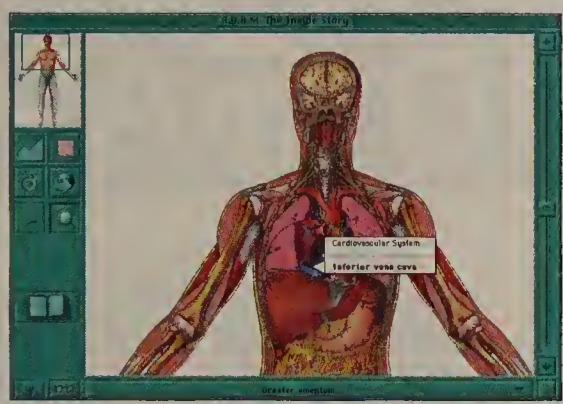
MW ★★★★★

A.D.A.M. THE INSIDE STORY, A SPIN-off from the vendor's line of anatomy software for health-care professionals, teaches about basic anatomy and physiology with a tantalizing mix of sound, graphics, and animation. It's a multimedia CD-ROM application that really delivers.

A.D.A.M. (Animated Dissection of Anatomy for Medicine) contains a self-running demo, a QuickTime catalog introducing the company's other products, and an installer program. You can either copy just the main application with its support files and extensions to your hard drive (it takes up about 5MB), or do a complete installation, which requires around 500MB of disk space. A.D.A.M. runs on any Macintosh with at least a 16MHz 68030 CPU and a double-speed CD-ROM drive.

A.D.A.M. is divided into two main sections. The first, a sort of do-it-yourself anatomy lab, opens automatically when you launch the program. Most of this window is taken up by exquisitely detailed renderings of the human body (see "An Inside Look.") A slider lets you peel structures away layer by layer to reveal what lies underneath. Icons let you choose a skin tone, switch between male and female anatomy, and view the body from the front or back. Clicking on any structure identifies it by name and system; you can also locate body parts via a pop-up menu.

A.D.A.M. enables you to look at the body's anatomy all at once or home in on a major organ system by highlighting its components. Either way, the drawings are as good as any I've ever seen in medical textbooks. For users who want to hide, ahem, sensitive body parts from view, you can opt to cover genitals and breasts with strategically placed fig leaves.



An Inside Look A.D.A.M.'s magnifying glass lets you enlarge and identify any part of the body by clicking on it.

A.D.A.M.'s other section, a pictorial introduction to physiology and disease called the Family Scrapbook, is even more entertaining. It offers a whimsical look at ourselves, with Adam and his significant other, Eve, as guides. Using a series of clever animations and drawings, the Family Scrapbook shows how our bodies work and what happens when things go wrong. If you prefer to explore, a menu lets you jump directly to any of A.D.A.M.'s more than 50 animations.

I found A.D.A.M.'s interface intuitive and easy to use. (If you get stuck, the program supports both online and balloon help.) As an incentive to register the software, you get a code that unlocks six anatomic puzzles when you call the vendor's toll-free number. Solve the puzzles and you're rewarded with a brief animation.

The Last Word Unlike many multimedia applications, A.D.A.M. left me wanting to see more. If you are the least bit interested in learning more about how the human body works, buy this program.
—FRANKLIN N. TESSLER, M.D.

WarPlanes 1.0

Multimedia Military-Flight CD-ROM

PROS: Stunning graphics; well-designed user interface; integrated flight simulators. **CONS:** Single window display; no text or graphics export facility. **COMPANY:** Maris Software (800/336-0185). **LIST PRICE:** $69.

MW ★★★★

WARPLANES IS A PLANNED SERIES of six multimedia CDs, covering worldwide military aviation; Modern Fighting Aircraft, the first edition, tours the post-WWII era. Unlike typical historical CDs, however, WarPlanes offers much more than dry facts sprinkled with a few pictures and movies. Yes, you get pictures and movies—more than 600MB's worth. But you also get beautifully rendered, rotatable, three-dimensional models of many aircraft; an extensive searchable database; campaign maps and historical narrations; live combat audio; and three flight simulators. And it's all tied together through a well-executed navigation program.

You run the program directly from the CD, which contains both Macintosh and Windows software. The navigation program takes over your screen with a contents overview. From this main panel you can jump to other panels to explore the aircraft and weapons databases, view historical vignettes, or take off in a flight simulator. The navigation tool includes built-in help that describes the function of all buttons as you pass over them.

WarPlanes' encyclopedic database covers virtually every detail of 530 U.S. and foreign aircraft, from the Bell 47 helicopter used in Korean War MASH units to the F117a stealth fighter that flew in the Gulf War. A sophisticated search engine lets you sort the database and locate specific aircraft by keyword. Each aircraft panel optionally links to photos, movies, or 3-D models. Most of the aircraft have one or more full-screen photos, about one-third have movies, and the most popular birds have 3-D models that you can rotate to view from any angle. Armament-carrying aircraft also include lists of weapons and diagrams showing where they fit on the airframe.

In addition to using the search engine, you can access the database through historical vignettes showing airfield panoramas and strategic maps. Clicking on an aircraft or weapon in these views retrieves the database panel for that item. The vignettes—covering post-Vietnam events only—also include historical videos providing a narrative overview of major conflicts.

Finally, you can fire up one of the three flight simulators: the Soviet Su-27 fighter, the U.S. C-130 transport, or the U.S. A-10 attack plane. The flight simulators have surprisingly good handling qualities, although they are weak on cockpit realism, giving you only a handful of instruments and controls. Still, you get extensive inside- and outside-view capabilities, and the ability to engage an enemy in battle.

Visual Treat A cockpit-motif control panel makes WarPlanes' aircraft collection easy to navigate.

The Last Word In spite of WarPlanes' good looks and excellent organization, I found myself wishing for multiple windows and an export facility for copying text or images. WarPlanes is a wonderful multimedia experience. I'm looking forward to the future editions.—MEL BECKMAN

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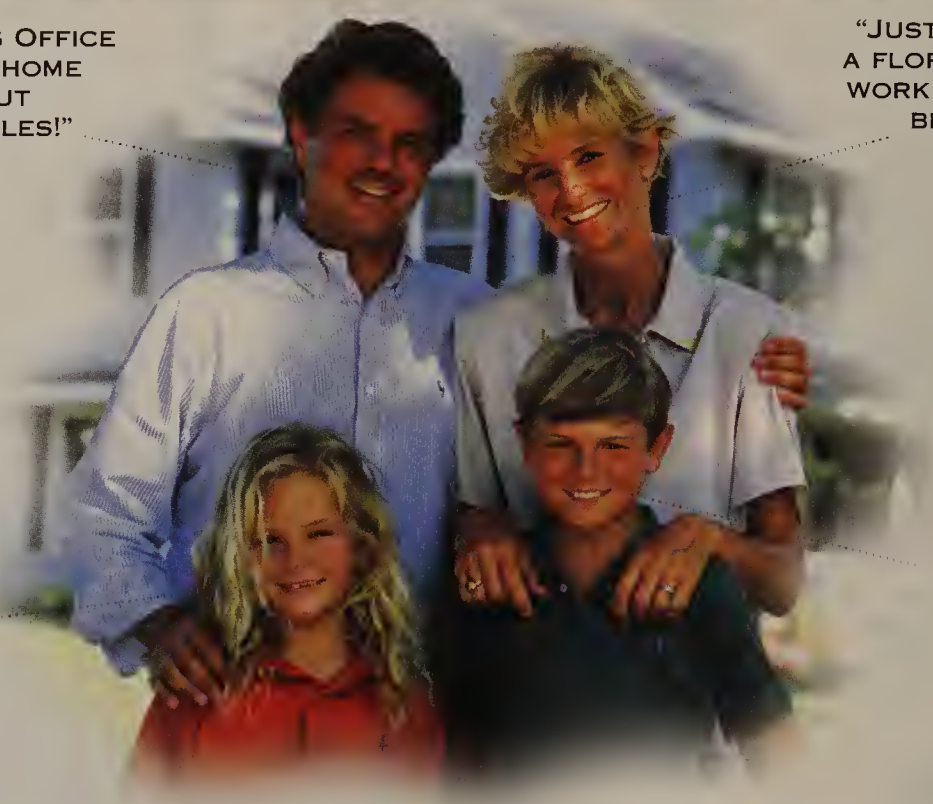

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Mouse Deluxe Mac

Three-Button Mouse

PROS: Users can set up buttons for keyboard shortcuts. **CONS:** Relatively high button resistance; shape may not suit some users. **COMPANY:** MicroSpeed (510/490-1403). **LIST PRICE:** $69.

MW ★★★

IF YOU'VE EVER BEEN CURIOUS ABOUT what Windows users do with the extra buttons on their mice, MicroSpeed's Mouse Deluxe Mac (MDM) gives you an opportunity to find out without abandoning your favorite computer.

Like Apple's ADB Mouse II, the MDM plugs into the Mac's Apple Desktop Bus (ADB) port. (The MDM's cable is a few inches shorter than the Apple mouse's, but that shouldn't be a problem for most users. Alas, neither cord includes a pass-through connector that would let you attach additional devices without using another ADB port.) The mouse ball stays in place with a thin cover that doesn't lock as tightly as Apple's, although it held steady under hard use. Four plastic feet on the bottom help the mouse glide smoothly over surfaces.

The MDM's external dimensions are almost identical to those of the Apple model, but numbers don't tell the whole story. The MDM's housing sports a more angular contour than the Apple mouse's; I found the MDM tiring to hold for long periods. The buttons also offer more resistance to pressure than I prefer, and the MDM's smooth plastic surface has a slippery feel that makes it hard to grip. (Like other pointing devices, though, mice are personal items; what suits you may not work for someone else. For some basic guidelines on how to choose an input device and set up your work area, see "Safer Computing," *Macworld*, December 1994.)

A sliding switch on the bottom of the MDM lets you control the operation of its three buttons. With the switch in one position (cryptically labeled "MS-2KEY"), all the buttons are equivalent to the one on Apple's mouse. In multibutton mode, the center button acts as if it's still being held down when you click and release it—handy for dragging to select multiple objects or to choose items from hierarchical menus. You use the remaining two buttons for clicking and shift-clicking, and you can swap their functions to suit right- or left-handed users.

To avoid shifting your hand repeatedly from mouse to keyboard, the MDM lets you use combinations of button-clicks to simulate keystrokes. Pressing and holding

RICHARD RETHEMEYER

the center button while clicking the left or right button from one to four times sends one of eight predefined commands to the Mac. A control panel that comes with the mouse lets you assign key combinations to mouse-clicks. Whether you find this feature helpful or not is entirely a matter of taste, though. (I didn't.) The control panel also allows you to adjust the MDM's tracking and double-click sensitivity.

The Last Word Although I prefer the ergonomics of Apple's mouse, the MDM's extra buttons do offer several features that Apple's can't match. If you're in the market for a new or replacement pointing device, the MDM is worth a look—just make sure you try it out first.

—FRANKLIN N. TESSLER

Kids World 1.01

Screen-Saver Creator

PROS: Easy to use; fun; modules are compatible with After Dark and UnderWare. **CONS:** Unsophisticated graphics; multiple animations cause jerky playback; limited painting tools. **COMPANY:** Bit Jugglers (415/968-3908). **COMPANY'S ESTIMATED PRICE:** $30.

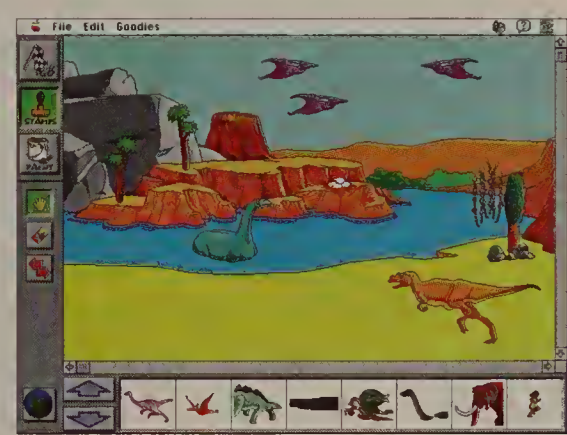
MW ★★★

THE LATEST OFFERING FROM BIT Jugglers—Kids World—isn't just a screen saver; it's a screen-saver construction set. Instead of providing you with the usual collection of colorful, witty screen-saver animations, Kids World provides a set of simple tools you use to design screen-saver modules. As its name suggests, Kids World is primarily for children—it features an uncomplicated, kid-friendly interface and simple, cartoonlike graphics—but adults too may find its build-your-own-screen-saver approach mildly addicting.

To create a Kids World document, you begin with a supplied backdrop: a grassy backyard, a prehistoric landscape, or one of several other choices. A richer selection would be nice. (Alternatively, you can use a plain black or white background or use the program's painting tools to draw your own backdrop.) Once you've selected a background, you can decorate it by choosing from more than 200 stamps of objects, plants, animals, and characters. Applying the stamps is easy: you grab a stamp from the palette, drag it onto the backdrop, and click to apply it. Tools for moving, erasing, and horizontally flipping any of the stamps are also included.

Kids World provides a basic, unintimidating palette of painting tools, including a pencil; a paint bucket; line, oval, and rectangle tools; and a text tool. You also get a 36-color palette and 16 textures (such as brick and marble) that you can paint onto your scenes.

Kids World's entertainment value emerges after you've created your picture. Many of the stamps are animated and include great sounds, so instead of a static painted scene you get a lively, noisy, animated sequence: rocket ships fly through space, pterodactyls screech and swoop over the landscape, chickens squawk and peck at the ground. (Don't worry; you also have the option of turning off the sound.) Of course, you can mix stamps and backgrounds in any wacky combination you please. The sounds and animations are really quite clever, though you have to be careful about overdoing it; screen savers containing more than



Jurassic Screen Saver Kids World's construction window makes it easy for children to grab stamps (displayed along the bottom) and pop them into a scene.

just a handful of animated stamps play back jerkily, especially on slower Macs.

To use your newly created screen-saver module, you save your work within Kids World and then open the UnderWare control panel included with the program. (You can also save your Kids World creations as After Dark modules.)

The Last Word Kids World's animations could be more fluid, the graphics more sophisticated, and the painting tools more robust, but as a children's program, it still succeeds. It's easy to use, cleverly designed, and can keep kids busy for hours—which is more than you can say about most screen savers.—JOSEPH SCHORR

You got a Mac. And then a few more. You tied them together. People started sharing. Everything

low they're sharing their frustration. With you. Time for a Workgroup Server.

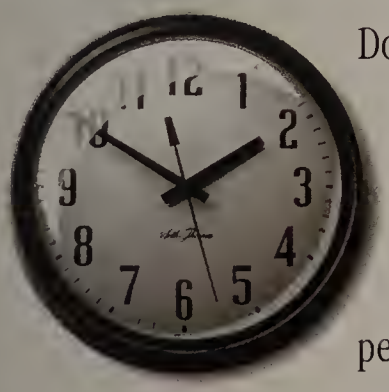
Funny thing about the Macintosh® computer. With little fanfare and an idea known simply as "plug and play," it turned a whole lot of novice users into networkers.

And is it any surprise? All you have to do is plug a connector into your Macintosh, and you're networked. You can share printers. You can share modems. You can even share files with your peers.

This kind of "peer-to-peer" network is all some workgroups need.

Others, however, soon find they're ready to take the next step: a Workgroup Server dedicated to improving the ebb and flow of vital information.

How do you know if you're ready? Just ask yourself a few simple questions.



Do I have more than five computers tied together in a peer-to-peer network? Is one printer always backlogged while others sit idle? When people share files, are their systems slowing down? Is there confusion about who has the latest data and where it resides?

If you answered yes to any of these questions, it's definitely time to consider a Workgroup Server from Apple.

Workgroup Servers provide a centralized place for users to store and share files. Which means your shared files don't get lost, your systems don't slow down and users always have access to the latest information.

A server also gives you a place to put network applications and services—accounting programs, databases, e-mail and more—for everyone to use.

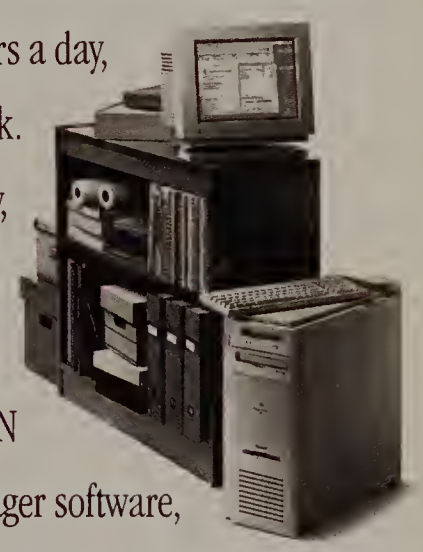
And that's just the start. With every Workgroup Server, you also get Dantz Retrospect Remote, so you can back up every system on the network—clients and servers—automatically. Plus Apple® RAID disk mirroring software, so you can rest easy about data reliability.

Want more still? Add FileWave software to your server, and you can easily distribute new programs and upgrades from the server. Or add Apple Remote Access software, and users can access your network from anywhere.

"OK," you say, "but how difficult is it to use a Workgroup Server?" It's as easy as using a Macintosh. All you have to do is connect the components, turn on the power, and you're ready to go.

Choosing the right server is just as easy. We have three models based on the new PowerPC™ RISC chip—the Workgroup Servers 6150, 8150 and 9150.

No matter which one you choose, you're backed by our expert phone support, 24 hours a day, 7 days a week.



And now, for a limited time, you'll get GraceLAN Server Manager software, a $395 retail value, at no extra charge.*

To get your free Workgroup Server brochure or for more information on our server trial program, simply pick up the phone and call us at 800-538-9696, ext. 430.** And unlock the power of your workgroup. The power to be your best.®

Apple®

*Offer applies to Workgroup Servers 6150, 8150 and 9150 only. **Program ends March 15, 1995. Offer good while supplies last. © 1994 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, Macintosh and "The power to be your best" are registered trademarks of Apple Computer, Inc. Mac is a trademark of Apple Computer, Inc. PowerPC is a trademark of International Business Machines Corporation, used under license therefrom. FileWave is a registered trademark of Wave Research, Inc. GraceLAN is a trademark of Technology Works, Inc. Retrospect Remote is a registered trademark of Dantz Development Corporation. Server Manager is a trademark and copyright of Santorini Consulting & Design, Inc.

Fit to Objects
Align Layer Views
Symbol Edit...
TrueType To Polyline
20 Properties...
Purge Unused Objects
Nudge
Make Guide
Select Guides
Hide Guides
Delete All Guides
Cam Construction...
Hex Socket Screw...
PLOTTING THE ERROR SURFACE AND CONTOUR
ERRSURF calculates errors for a neuron with a range of possible weight an bias values. PLOTES plots this error surface with a contour plot underneath.

Power Mac Software Soars

Macworld Lab uncovers which software benefits most from the PowerPC boost

BY JIM HEID

Last year Apple took one of the biggest gambles in its history by introducing the Power Macintosh family: new Macs driven by a radically different microprocessor architecture that promises vastly improved performance—provided that developers design their programs to take advantage of it.

Less than one year later, most major Mac software developers have adapted their wares. Have the performance promises been kept? To find out, Macworld Lab pitted 28 native Power Mac programs against their 680X0 counterparts in a variety of application categories, from graphics and design software to digital video to spreadsheets and word processors.

Our goal was not to find the fastest Power Mac application in each category. Instead, we sought to find the programs that show the greatest performance improvements over their twins in the 680X0 world. If you're now using one of these programs on a 680X0 Mac, our results can help you assess the benefits of upgrading to a Power Mac and native software.

Another goal was to identify the application categories that benefit most from Power Mac performance. Again, if you're now using a 680X0 Mac, knowing the degree to which various tasks take advantage of native Power Mac software can help you decide when and whether you should take the Power Mac plunge. This decision can be especially difficult if you're using a fast 68040 Mac, such as a Quadra 840AV.

The Big Performance Picture

In Macworld Lab's tests, a Power Mac 7100/66 averaged about 2.3 times as fast as a Centris 650. In a range of tests that represent commonly performed tasks, three programs averaged at least 3 times as fast on the Power Mac, and one of those averaged 9.7 times as fast.

The jobs that benefit most from native software are, not surprisingly, those requiring extensive processing, such as rendering three-dimensional images and manipulating complex illustrations. In these tests, the Power Mac 7100/66 averaged about 4 times as fast as the Centris 650.

WILL CROCKER

The Power Mac also showed its head for figures in tests involving spreadsheet recalculation and mathematical analysis based on floating-point unit (FPU) processing: the 7100/66 was 2 to 4 times as fast as the Centris 650.

Although the performance difference wasn't as dramatic, we also saw improvement in the basic productivity tasks that most people perform. Thanks in part to the fact that the Mac's QuickDraw graphics software—unlike some other parts of the operating system—is written in native Power Mac code, the 7100/66 averaged 1.8 times as fast in document-scrolling tests. In a word processor search-and-replace and font-change test, the 7100/66 was an average of 1.5 times as fast as the Centris 650.

CAD and 3-D: The Big Winners

The PowerPC processor in Power Macs does everything quickly, but it's especially adept at floating-point calculations. A PowerPC chip also delivers its best performance when supplied with a steady torrent of data from a program. When the chip is waiting—for a slow storage device, for example, or for an even slower typist—it isn't performing at its full potential.

Given these factors, it isn't surprising that native Power Mac computer-aided design (CAD) and 3-D rendering packages showed the largest overall performance increases over their 680X0 counterparts. Both software categories make use of floating-point math, and both involve operations that can satisfy a PowerPC chip's thirst for data, such as rotating a complex illustration and calculating a 3-D image's lighting and shading.

Of the five CAD programs we tested, the native Power Mac application that most outperformed its 680X0 twin was Graphsoft's Blueprint, which was, on average, a whopping 9.7 times as fast. If you're relying on Blueprint on a 680X0 Mac, drop this magazine now, buy a Power Mac upgrade, and change your software to the Power Mac version. In a test involving a 90-degree rotation of a complex image, Blueprint's Power Mac version was more than 26 times as fast as its 680X0 version, completing the task in 45 seconds instead of 20 minutes. This obviously helped the program's overall score, but Blueprint did well in other tests, too, with the Power Mac version performing 2 to 5 times as fast as the 680X0 version.

Ashlar's Vellum 3D is another native Power Mac CAD program that humbled its 680X0 twin. The Power Mac version of Vellum was, on average, 4.2 times as fast. It was especially quick when switching views and redrawing an image, performing more than 6 times as fast as the 680X0 version.

In one test, Blueprint for Power Mac was more than 26 times as fast

One native Power Mac CAD program that didn't significantly outperform its 680X0 counterpart was Engineered Software's PowerCADD; its overall performance was only slightly better than PowerDraw 6.0. (Despite the difference in names, the programs have similar features and identical file formats.) These results don't mean that PowerCADD is a slow Power Mac program—it isn't. Instead, the results show PowerDraw 6.0 to be a sizzling 680X0 program (Engineered Software says it's 5 to 8 times faster than PowerDraw 5.0). The message, then, is that if your primary work involves PowerDraw on a 680X0 Mac, don't feel an immediate need to upgrade to a Power Mac and PowerCADD; just be sure to use PowerDraw 6.0. And note that Engineered Software is working on a PowerCADD upgrade, scheduled to ship by the end of March, whose performance the firm says will leapfrog PowerDraw's.

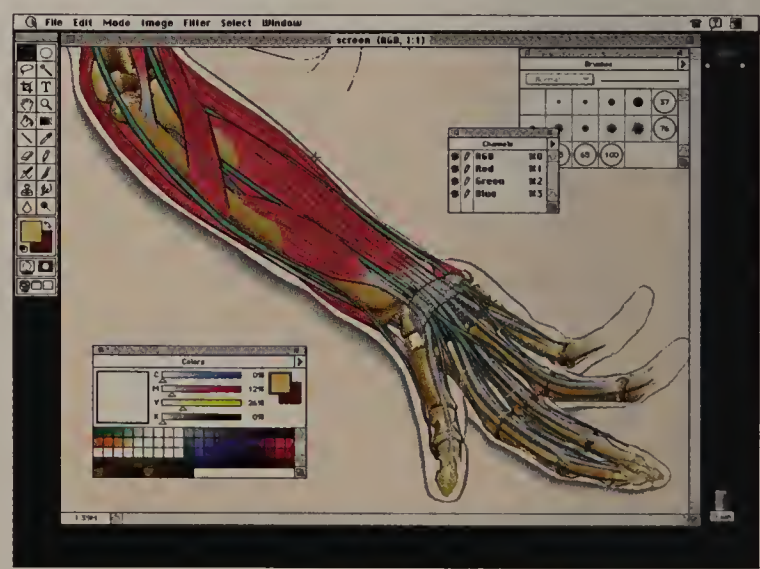
The 3-D programs we tested are Specular International's Infini-D, Ray Dream's Designer, and Strata's StrataVision 3d and StudioPro. As expected, we found that a Power Mac is clearly the best place to experience the third dimension: the 7100/66 rendered images 1.8 to 3.6 times as fast as the Centris 650. The native Power Mac version of Graphisoft's ArchiCAD, a package with 3-D rendering features, was 4 times as fast at rendering, taking just over 1 minute, compared with nearly 5 minutes in the 680X0 version. (Don't confuse Graphisoft with Graphsoft, which produces Blueprint and MiniCad.)

Imaging and Illustration Gains

Native Power Mac versions of today's leading imaging and illustration programs—Adobe Photoshop and Illustrator, Macromedia FreeHand, and Fractal Design Painter—didn't all show the same degree of performance improvement seen in the CAD and 3-D programs. Still, they proved the Power Mac's superiority for graphics work.

One of the most time-consuming tasks in Adobe Photoshop is filtering. In our tests, two often-used Photoshop filters—Unsharp Mask and Gaussian Blur—were about 3 times as fast on the Power Mac 7100/66; the Unsharp Mask filter took about 6 seconds instead of nearly 17, while the Gaussian Blur filter took about 4 seconds versus almost 13. In another common Photoshop chore, converting an RGB image to CMYK format, the 7100/66 was 3.9 times as fast.

Alas, in a disk-intensive test (opening a 15MB file), the native Power Mac Photoshop was only 1.3 times as fast as the 680X0 version. This is because Apple has not yet rewritten the Mac Operating System's disk input/output software to run native on Power Macs (see "The Power Mac's Weak Link"). That's too



Photoshop Filters Fly Using the Power Mac version of Photoshop, complex operations such as Unsharp Mask and Gaussian Blur move at several times the speed of the 680X0 version.

Power Mac Software: How Much Faster than 680X0 Versions?

These results show the relative speed of a 66MHz Power Mac 7100/66 running native Power Mac software and a 25MHz Centris 650 running 680X0 versions of the same programs. Categories are ranked in order of average degree of improvement over 680X0 versions; products are ranked likewise within categories. The figures should not be used to rank applications by speed. (For example, while the Power Mac version of Blueprint is 9.7 times as fast as the 680X0 version, Blueprint may not be faster than PowerCADD.)

Longer bars are better.

TIMES AS FAST AS 680X0 VERSION: OVERALL		TIMES AS FAST AS 680X0 VERSION: SPECIFIC TASKS
CAD		
Blueprint 5.0.0b3	9.7	rotate 90° left 26.8; scale 5.1; open 4.3; redraw 2.7
Vellum 3D 2.63f	4.2	redraw 6.8; front view 6.4; group 2.5; open 1.2
MiniCad 5.0.1	2.8	render 4.4; convert to 3-D mesh 2.3; open 1.8
ArchiCAD 4.5+	2.2	PhotoRender 4.0; rebuild 2.1; rotate 1.9; multiply image 1.9; create walk-through 1.2
PowerCADD 1.0	1.2	scale column layer 1.4; align column layer 1.4; rotate text layer 1.2; open 0.9
Image processing		
Photoshop 3.0	2.9	convert to CMYK 3.9; Gaussian Blur 3.4; Unsharp Mask 3.0; open 1.3
Painter 2.0b	2.1	auto clone 3.5; adjust dye concentration 2.1; apply surface texture 1.5; open 1.2
Video editing		
Premiere 4.0	2.1	Cinipak compression 3.4; movie assembly 1.9; antialias filter 1.5; burn time code 1.5
3-D modeling		
Infini-D 2.6	2.6	render 3.6; DXF import 1.6
Designer 3.1	2.4	render 3.4; open 1.4
StrataVision 3d 3.1	1.6	render image 2.7; render movie 1.8; open 0.4
StudioPro 1.1a	1.6	render movie 2.7; open 1.7; render image 0.4
Analytic		
Mathematica 2.2.2	3.1	matrices 4.3; higher math 4.1; graphics 3.1; algebra/calculus 2.8; numerical calc 1.2
Excel 5.0	2.0	recalc FPU 3.3; recalc non-FPU 1.4; scroll 1.4
4th Dimension	1.0	search 1.2; open 0.8
Illustration		
FreeHand 4.0a	2.5	skew 28.9° 3.8; magnify 2.3; print to disk 2.3; preview 2.2; open 1.8
ClarisDraw 1.0	1.6	rotate 90° 1.7; scale 75% 1.7; apply gradient 1.6; fit to view 1.4
Illustrator 5.5	1.6	preview 2.3; resize 1.7; rotate 1.6; print to disk 0.8
Publishing		
FrameMaker 4.0.4	2.0	change font 2.8; scroll 2.1; create index 1.9; create EPS file 1.0
PageMaker 5.0a	1.8	search/replace 2.8; scroll 1.9; change font 1.7; open 1.7; create EPS file 1.0
QuarkXPress 3.31	1.5	search/replace 2.5; scroll 1.8; create EPS file w/Seps 1.3; create EPS file 1.0; open 0.7
Utilities		
Compact Pro 1.50	1.8	compression 2.1; decompression 1.6
StuffIt Deluxe 3.5	1.7	decompression 1.7; compression 1.6
Retrospect 2.1	1.4	back up 1.5; restore 1.4
Word processing		
MacWrite Pro 1.5v3	1.4	scroll 2.7; change font 1.5; search/replace 1.1; import 0.8
WordPerfect 3.1	1.5	search/replace 1.8; change font 1.7; scroll 1.5; import 0.8
Word 6.0*	1.1	search/replace 1.5; scroll 1.5; change font 1.2; word count 1.2; open 0.8; print to disk 0.5
Integrated software		
ClarisWorks 2.1 v3	1.3	SS recalc non-FPU 2.8; SS recalc FPU 2.2; WP scroll 1.6; SS scroll FPU 1.4; WP search/replace 1.3; WP change font 1.2; WP import 0.8; SS open FPU 0.7; DB sort memory 0.6; DB sort disk 0.6

**Times as fast as 680X0 version 5.1: overall 0.7; search/replace 1.4; change font 1.0; scroll 0.8; open 0.5; print to disk 0.3; word count 0.2.*

BEHIND OUR TESTS

These tests represent a typical range of tasks performed in each application; we averaged the results of three trials for each test to come up with the final results. The most significant speed improvements come from applications that take advantage of a floating-point unit. These include all CAD and modeling applications. Most disk-intensive tasks showed little if any improvement using the Power Mac versions, and some even showed slower performance because portions of the Macintosh Operating System have not yet been rewritten in native Power Mac code.

Macworld Lab tested all the 680X0 applications on a Centris 650 with 24MB of RAM, using internal 8-bit video with a 16-inch Apple monitor and an external 1GB Micropolis hard drive. For testing Retrospect, we also used a 230MB Quantum internal hard drive. System 7.5 was installed with standard Apple extensions and Adobe Type Manager. The disk cache was set at 96K, the 040 cache was set to Faster, 32-bit addressing was on, AppleTalk was inactive, and file sharing was off. All native Power Mac software was tested on a similarly configured Power Mac 7100/66. Modern Memory Manager was turned on and virtual memory was turned off. All application memory partitions were adjusted to take full advantage of each platform.—**Macworld Lab testing supervised by Danny Lee**

bad, because imaging professionals spend a good portion of the day opening and saving large images.

Another leading imaging program, Fractal Design's Painter, averaged 2.1 times as fast in the Power Mac version. Painter's Auto Clone feature, commonly used when adding natural-media painting effects to a scanned photograph, was 3.5 times as fast. Like Photoshop, though, the Power Mac version of Painter was hamstrung by the Mac OS's lack of a native file system, so opening an image file is only slightly faster than in the 680X0 version.

Among illustration programs, Adobe Illustrator was an average of 1.6 times as fast on the 7100/66 as on the Centris 650, while Macromedia FreeHand averaged 2.5 times as fast on the Power Mac. (Again, don't be tempted to compare Illustrator's results with FreeHand's—our tests were designed only to show how a native Power Mac program compares with its 680X0 version.)

Illustrator's showing requires some explanation. The program's weakness was in a print-to-disk test (creating an EPS file), where the Power Mac 7100/66 was slightly slower than the Centris 650. In other Illustrator tests, the 7100/66 was consistently 1.6 to 2.3 times as fast; it performed best with one of Illustrator's mainstay commands, Preview, which did its work in about 19 seconds, compared with about 45 on the Centris 650. Thus, if you're using Illustrator on a 680X0 Mac, there's a definite argument for going native Power Mac—but don't expect to save time on printing related tasks.

For its part, FreeHand seemed unfazed by the Mac OS's nonnative file system. Tasks involving extensive disk access—opening a large file and printing it to disk—were 1.8 to 2.3 times as fast on the Power Mac 7100/66. Image zooming and previewing were more than twice as fast, and the Skew tool was nearly 4 times as fast. If you've stuck with FreeHand even as it's changed hands in the past year, your loyalty will be rewarded on the Power Mac platform.

Compared with 680X0 versions, Power Mac programs averaged

2.3 times as fast

Power Publishing

Publishing programs are highly interactive: rather than constantly crunching through calculations, they spend much of their time waiting for you to tweak a layout, type some text, or import a file. (Imaging and illustration programs are highly interactive, too, but they also perform processor-intensive tasks, such as filtering, rotating, and previewing large images or illustrations.) Because publishing programs do more waiting than processing, their native Power Mac versions showed smaller overall performance gains than the programs I've discussed so far. But in tasks that do require extensive processing, they don't disappoint.

One such task is a lengthy search-and-replace operation. In this test, PageMaker on a Power Mac 7100/66 was 2.8 times as fast as on a Centris 650, while QuarkXPress was 2.5 times as fast. The basic chore of scrolling was also nearly twice as fast in both programs. Printing to disk was about the same speed on the Power Mac, due to the nonnative file system and printer driver. The file-system bottleneck caused the native version of QuarkXPress to be slower than the 680X0 version when opening a publication file. (Aldus seems to have worked around the problem—the native Power Mac PageMaker opened a publication 1.7 times as fast as the 680X0 version.)

On the Power Mac 7100/66, Frame Technology's FrameMaker averaged twice as fast as on the Centris 650. In a spot check that involved importing a lengthy Microsoft Word document into FrameMaker, however, the 7100/66 was significantly slower than the Centris 650. The reason: FrameMaker's Word import filter is written in 680X0 code, so the application actually runs in emulation mode when importing Word documents—or, for that matter, any files that use XTND filters. (FrameMaker's graphics filters are in native Power Mac code.)

But in tests involving scrolling, changing fonts, and compiling an index in FrameMaker, the Power Mac 7100/66 was 1.9 to 2.8 times as fast as the Centris 650. Thus, the argument for upgrading to a Power Mac and the native FrameMaker is strongest if you do most of your writing within the program, rather than in a separate word processor.

Where native-mode Power Mac upgrades are concerned, desktop publishers have one additional factor to consider: unlike almost all of the other programs we tested, PageMaker and QuarkXPress do not include both Power Mac and 680X0 versions in the same box; you must buy the version appropriate to your platform. And FrameMaker includes upgrades for both platforms only in the CD-ROM version (it has the same list price—$895—as the floppy-based version). Macromedia FreeHand and Engineered Software's PowerCADD are also sold separately for each platform (see "Tested Power Mac Software").

Power Productivity

And what of the bread-and-butter programs for which most people buy a computer—word processing and spreadsheet analysis? There isn't exactly a glut of native Power Mac office-productivity applications. Claris released a Power Mac version of ClarisWorks shortly after the

ArchiCAD Rendering Rendering a 16-step construction of this house in ArchiCAD is 4 times as fast using the Power Mac version.

Tested Power Mac Software

Company	Phone	Product [A]	List Price	Upgrade Price (from version)	Type of Program
ACI US	408/252-4444	4th Dimension 3.2	$895	free (3.1)	database (analytic)
Adobe Systems	415/961-4400, 800/833-6687	Illustrator 5.5	$595	$99 (5.0)	illustration
		PageMaker 5.0a [B]	$895	$179 (5.0)	publishing
		Photoshop 3.01	$895	$149 (2.5.1)	image processing
		Premiere 4.0	$795	$129 (3.0)	video editing
Aladdin Systems	408/761-6200	StuffIt Deluxe 3.5	$130	$35 (all)	compression utility
Ashlar	408/746-1800	Vellum 3D 2.63f	$2995	$14 (2.5)	CAD
Claris	408/987-7000	ClarisDraw 1.0	$399	$89 (MacDraw Pro)	illustration
		ClarisWorks 3.0	$129	$59 (2.0)	integrated software
		MacWrite Pro 1.5v3	$99	$69 (1.5)	word processing
Dantz Development	510/253-3000	Retrospect 2.1	$249	$20 (2.0)	backup utility
Engineered Software	910/299-4843	PowerCADD 1.0 [B, C]	$795	$79 (PowerDraw 6.0)	CAD
Fractal Design	408/688-5300	Painter 2.0b	$399	$15 (2.0)	image processing
Frame Technology	408/975-6000	FrameMaker 4.0.4 [D]	$895	$95 (4.0)	publishing
Bill Goodman	available online	Compact Pro 1.50	$25 shareware	not applicable	compression utility
Graphisoft	415/737-8665, 800/344-3468	ArchiCAD 4.5+	$4450	free (4.12)	CAD
Graphsoft	410/290-5114	Blueprint 5.0.0b3	$295	$99 (4.0)	CAD
		MiniCad 5.0.1	$795	$150 (4.0)	CAD
Macromedia	415/252-2000	FreeHand 4.0a [B]	$595	$99 (3.0)	illustration
Microsoft	206/882-8080, 800/426-9400	Excel 5.0	$339	$129 (4.0)	spreadsheet (analytic)
		Word 6.0	$339	$129 (5.1)	word processing
Novell Applications Group	801/225-5000	WordPerfect 3.1	$395	$69 (3.0)	word processing
Quark	303/894-8888	QuarkXPress 3.31 [B]	$895	$225 (3.3)	publishing
Ray Dream	415/960-0768	Designer 3.1	$349	$29 (3.0)	3-D modeling
Specular International	413/253-3100, 800/433-7732	Infini-D 2.6	$695	$49 (2.5)	3-D modeling
Strata	801/628-5218, 800/869-6855	StudioPro 1.5	$1495	$99 (1.1)	3-D modeling
		StrataVision 3d 3.1a	$695	$99 (3.0)	3-D modeling
Wolfram Research	217/398-0700, 800/441-6284	Mathematica 2.2.2	$995	$135 (2.1)	mathematics (analytic)

[A] All products ship with 680X0 Mac and Power Mac versions in the same box, unless otherwise noted. Different upgrade prices may be available for users of earlier versions; check with the company. [B] 680X0 Mac and Power Mac versions sold separately. [C] 680X0 Mac version called PowerDraw. [D] 680X0 and Power Mac programs together in CD-ROM version of product only.

Power Macs debuted; WordPerfect, now owned by Novell, also promptly shipped a native version of its flagship word processor. Even Microsoft finally got around to shipping Power Mac versions of Word, Excel, PowerPoint, and FoxPro (although FoxPro and PowerPoint shipped too late to test here).

In our tests, the Power Mac–native Excel 5.0 was, on average, twice as fast as the 680X0 version. When recalculating a worksheet that uses floating-point math, the Power Mac version was 3.3 times as fast, performing the operation in less than 7 seconds, compared with nearly 22 seconds on the Centris 650.

The native Power Mac version of Word 6.0 also shows less promise. If you're among the Word users who have felt like tarring and feathering Word 6 for its sluggish performance on 680X0 Macs (see "Word Processing Powerhouses," in this issue), the Power Mac version won't lower your blood pressure. The Power Mac version of Word 6.0 was barely faster, overall, than it's 680X0 counterpart and substantially slower, on most tests, than Word 5.1 running on a Centris 650. The Power Mac version took a big performance hit on all I/O-related tasks, such as open, and print to PostScript.

Claris has also shipped a Power Mac version of MacWrite Pro. Its performance was uninspiring: in a document-scrolling test, the Power Mac 7100/66 was 2.7 times as fast as the Centris 650, but in other tests the 7100/66 was no more than 1.5 times as fast; and in a file-import test, the 7100/66 was slightly slower than the Centris. The word processor module in ClarisWorks showed similarly lukewarm improvements. The ClarisWorks spreadsheet, on the other hand, was significantly faster at recalculation.

The Power Mac version of WordPerfect showed similarly modest improvements. Its best events were a font-change test (in which the 7100/66 was 1.7 times as fast as the Centris 650) and a search-and-replace test (1.8 times as fast). Scrolling was 1.5 times as fast, but importing a file was slightly slower.

Taken together, these results suggest that if you're using a relatively fast 680X0 Mac primarily to create simple documents, upgrading to a Power Mac and a native word processor may involve more trouble and expense than it's worth. The case for a Power Mac is stronger if you create elaborately formatted documents, if you switch constantly between editing and page-preview modes, or if you create lengthy documents containing indexes (which require extensive processing to compile). But by and large, word processing is not the best argument for a RISC machine.

Nor is database management. ACI US's 4th Dimension averaged the same speed on both Macs. Searching a 96,000-record database, for example, took 5 minutes on the 7100/66 and 5 minutes 48 seconds on the Centris 650. Opening the

application took slightly longer on the 7100/66.

A variety of popular utilities benefit from Power Mac performance. Aladdin Systems' StuffIt Deluxe was 1.7 times as fast at compressing and decompressing archive files on the 7100/66; Bill Goodman's shareware Compact Pro was 1.6 times as fast at decompressing and 2.1 times as fast at compressing. Dantz Development's Retrospect backup utility averaged 1.4 times as fast at backing up and restoring 800MB of data in compressed form. Other utilities that sing on a Power Mac include security programs that perform encryption.

The Last Word

Based on Macworld Lab's tests, the functions that benefit from Power Mac performance are, from greatest benefit to least:

- CAD, 3-D rendering, and mathematical analysis
- illustration, image editing, and video compression
- spreadsheet analysis
- page layout
- word processing
- database management

The more processor-intensive your work, the more you'll benefit from a Power Mac and native software. But don't jump to the conclusion that a Power Mac's performance will go wasted unless you're an architect, an artist, or a mathematician. A Power Mac provides incidental speed benefits that don't show up on a stopwatch. In native Power Mac graphics programs, for example, freehand drawing feels more natural—there's less lag between when you move your mouse and when a line appears on the screen. Scrolling a large image in a program such as Photoshop is also smoother on Power Macs.

If you have enough RAM installed, a Power Mac is also better equipped to handle the juggling act of multitasking—it's less likely than a 680X0 Mac to bog down when you're downloading a file or rendering an image in the background. Power Macs support CD-quality sound recording and playback; among 680X0 Macs, only the Quadra 660AV and 840AV do. And in general, a Power Mac just feels snappier—and this comes from someone whose main machine is a Quadra 840AV.

Not that the fast 680X0 Macs are obsolete. If you have one, and if your work leans more toward office productivity than imaging and math, the argument for a Power Mac is less compelling. Indeed, thanks to the 840AV's DSP chip, some Photoshop operations approach Power Mac performance levels. If yours is a fast 680X0 Mac, you might wait for a future generation of Power Macs, whose performance will settle the debate once and for all.

But if your work does involve those processor-intensive jobs at which Power Macs shine, here's an excellent reason to upgrade now: your time. It makes a dramatic, practical difference in productivity when an artist can render photo-realistic 3-D images in 5 minutes instead of 20, or when an architect can watch an image redraw in 3 seconds instead of 22, or when a video producer can compress a QuickTime movie in 30 minutes instead of 2 hours.

Thanks in large measure to the efforts of third-party developers, Apple's risk has paid off: the Power Macs deliver on their performance promise. **m**

Contributing editor JIM HEID has been working with the 680X0 Mac and Power Mac lines since before each was introduced. His latest books are *Macworld Complete Mac Handbook Plus Interactive CD*, third edition, and *Macworld Word 6 Companion* (both IDG Books Worldwide, 1994).

THE POWER MAC'S WEAK LINK

Native Power Mac software generally delivers impressive performance, but Macworld Lab tests revealed some areas where the gains were either small or nonexistent.

The problem surfaces in activities dealing with disk input and output (disk I/O). In tests involving opening a document, importing a file, sorting a database, or printing to a disk file, most native Power Mac applications were at best only slightly faster than their 680X0 counterparts. Several Power Mac programs, including Illustrator, QuarkXPress, PowerCADD, ClarisWorks, StrataVision 3d, and WordPerfect, were actually slower.

What's behind the weak link? For one thing, Apple has not yet rewritten the Mac OS's file system—the software that deals with disk I/O—to run in native mode on Power Macs. As a result, native applications must go through the 680X0 emulator when reading from or writing to disk files.

And if a native Power Mac application alternates between processing data and reading it, the slowdown can become particularly significant, as the program forces the Mac OS to switch between native and emulated code. This is probably the reason the Power Mac versions of Strata StudioPro and StrataVision 3d took about three times as long to open documents as did their 680X0 counterparts. (Engineers at Strata were still investigating the slowdown at this writing.)

As mentioned elsewhere in this article, the process of importing a file can be further slowed by import converters that are written in 680X0 code. In our tests, Power Mac applications were consistently slower than their 680X0 twins in file-import tests. A similar slowdown occurs during printing, and for a similar reason: the Mac's PostScript printer driver is not native on Power Macs.

Yet despite these performance challenges, a few Power Mac programs actually managed significant gains over their 680X0 counterparts in I/O- or printing-related tests. Macromedia FreeHand did best: its Power Mac version was 2.3 times as fast at printing to a PostScript file, and 1.8 times as fast at opening a file. Jim Gable, Apple's Power Mac product line manager, told me that Altsys Corporation, FreeHand's developer, wrote the program using very "clean" coding techniques that allowed the firm to do an extra measure of performance optimization when creating the Power Mac version.

Adobe PageMaker did well, too: its native version was 1.7 times as fast as the 680X0 version at opening a file. And while the majority of programs were slower at printing to a disk file, the native PageMaker was a few seconds faster. Similarly, the native QuarkXPress was 1.7 times faster than its 680X0 counterpart at printing to disk. (The native QuarkXPress was 30 percent slower at opening a document, however.) Graphsoft's Blueprint and MiniCAD were also significantly faster at opening a document.

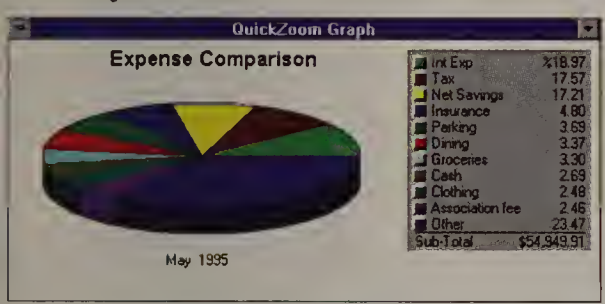
All this illustrates that creating a fast Power Mac program involves more than just recompiling 680X0 code to take advantage of the PowerPC chip. Developers must also work around the possible pitfalls caused by the mixed-mode architecture of the Mac OS. Programmers have been working around the limitations of operating systems for decades, but having to straddle two types of processor architectures is a new challenge. Altsys, Adobe, Quark, and Graphsoft show that it can be done.

"Now that we know where our money is going, we're on our way!"

John Marshall
Nancy Marshall

John: "**Before Quicken, doing the finances was truly painful.** I still remember how many boxes full of bills and paperwork we used to have!"

Nancy: "**Now life is a whole lot easier** with all our bank accounts, loans, credit cards and investments together in one place — on Quicken!"

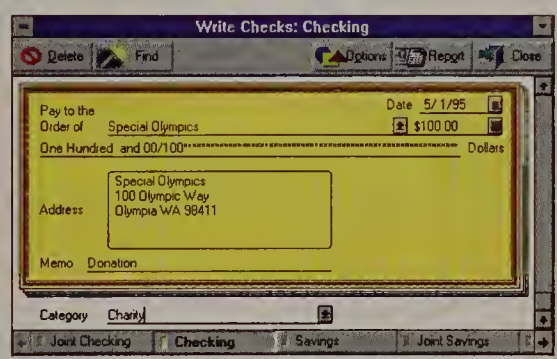


"The charts and graphs allow us to instantly see what money's coming in and where it's going with just a mouseclick."

John: "**We're finally in control of our money,** because now we know where it's going. There's never a question of who's spending what or when. The charts and graphs tell us exactly how much money goes to the groceries, children's clothing, insurance, you name it — it's quite an eye opener."

Nancy: "**We were up and running with Quicken right away.** Didn't even open the manual at first. We reconcile our accounts to the penny — in just a few minutes. Last year, we did the taxes in an hour and a half, then used the free time to go to the movies!"

"We're planning our second vacation this year! Quicken showed us how."
John Marshall, freelance videographer, with his wife Nancy, son John Glenn and Whiskers the dog, Austin, Texas.



"Paying the bills is a piece of cake. Quicken's checkwriting screen looks and works just like our old paper checkbook."

John: "**We're planning our second vacation this year!** Quicken showed us where we could put the money aside to pay for it. It not only helps us determine our budget, but tells us how much we can cut back and how much extra we have."

John: "**Everyone can afford Quicken.**"

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Circle 202 on reader service card

The Agfa Arcus II (top) and the Umax Power-Look (bottom).

Six new flatbed scanners can capture 30 or more bits of color. Macworld Lab reveals the real-world benefits.

Scanning Beyond 24 Bits

by Steve Roth

ARE YOU TIRED OF FIGHTING WITH YOUR scans? Are you frustrated because you can't get your images to look right using the brightness and contrast tools in your scanning software—or even the Levels and Curves controls in Adobe Photoshop? Does it make you crazy that every time you manage to pull out elusive shadow details, your highlights get blown out to white? Are you getting the urge to junk this whole scanner business and buy a new stat camera?

Stop. You're not alone. Even though many scanner users have abandoned those (useless) contrast and brightness controls in favor of curve-based adjustment tools, most people are still hitting the same wall—especially with images that include subtle highlight *and* shadow detail. You can get one or the other, but it's difficult to get both.

The problem is GIGO: garbage in, garbage out. If you don't start with a good scan—one that captures the subtle details in highlights and shadows—you'll be hard pressed to bring out those details with tonal correction. Those subtle differences—one pixel that's 96 percent gray and one next to it that's 95 percent gray—are the stuff that detail is made of. If your scanner can capture those differences, and if you can use tonal correction to emphasize them, you can produce images that rival the best in the business.

Unfortunately, most flatbed scanners can't capture the whole range of detail terribly well. Theoretically, 8-bit scanners can discern 256 shades of gray (24-bit scanners just scan 8 bits three times, for red, green, and blue). But the 7th and 8th bits of data aren't terribly accurate; they don't properly represent the details in your images.

One of the best solutions to emerge in recent years is the desktop flatbed scanner capable of cap-

STAN MUSILEK

turing more than 8 bits of data—10, 12, or in some cases 16 bits per pixel. As with 8-bit scanners, the last few bits aren't terribly accurate. But the scanner automatically throws away those garbage bits, and you get 8 good bits of data to work with.

Macworld Lab tested six of these low- to midprice *high-bit* models—from Agfa, Epson, Microtek, Ricoh, and Umax—to see how well the scanners handle gray sensitivity, color accuracy, and speed, among other things (see the table "Scanners Compared," and the benchmarks "Gray Sensitivity," "Color Variation," and "Scanner Speed"). In addition to the scanners we tested, at least three other 30-bit flatbeds should be available by the time you read this (but they weren't available for our review): La Cie's 600-by-1200-dpi SilverScanner III ($1499, 503/520-9000); PixelCraft's 600-by-2400-dpi Pro Imager 4000 ($2995, 510/562-2480); and Nikon's 565-by-1200-dpi Scantouch AX-1200 ($1535, 516/547-4200).

Tapping the Hardware

In our lab tests of the high-bit scanners, we found that the best of them (notably the Agfa Arcus II and Umax PowerLook) deliver greater image detail and more-accurate color than their 24-bit counterparts, so you don't have to fight with your scans so much. You don't end up with posterization in the shadows after correction (you avoid big jumps from one gray to another where there should be smooth tonal changes), and there's still some variation (read: detail) in the highlights. And you don't have to work so hard to battle the artifacts and anomalies that result from excessive color correction.

The more-accurate data from high-bit scanners is one reason for their higher-quality output, but the ability to perform tonal correction on high-bit data is even more important, because you lose less data in the correction process.

Anytime you adjust the tonal-correction curve, you throw away some data. Typically, you want to bring out the shadow details—making the pixels in the shadow areas more different. But when you do, you make highlight pixels more similar—losing detail there.

With high-bit scanners, the scanning software can download a tonal-correction curve to the scanner, so the scanner can perform the correction on the high-bit data—before converting the data to 8 bits—resulting in less data loss and a better scan to work with.

Resolution

Scanner resolution is much easier to nail down than tonal and color sensitivity, so many people pay a lot of attention to resolution when shopping for scanners. But in fact, higher resolution may not be very important for you.

How much resolution do you need? Let's say you only output to a 600-dpi laser printer at an 85-lpi screen frequency. If you follow the rule that gray-scale and color-image resolution should be between 1.2 and 2 times screen frequency (and that you shouldn't scan an image at a higher resolution than your output device can support), you never need an image with more than 170 dpi.

If you output at higher screen frequencies, however, or you need to scan small originals and scale them up, you need higher-resolution scans. And for line-art work—which requires image resolution equal to your output resolution (or at least 800 dpi on high-res laser printers and imagesetters)—high scanner resolution is important.

The only resolution number that's really important is a scanner's true optical resolution—how many dpi it can actually see. Many scanner manufacturers advertise ridiculously high interpolated-

Scanners Compared

	Agfa Arcus II	Agfa StudioScan II	Epson ES-1200C	Microtek ScanMaker III
Performance Rankings				
Gray sensitivity [A]	excellent	fair	good	poor
Color variation [B]	excellent	excellent	fair	poor
Speed [C]	poor	fair	excellent	good
Previewing	excellent	excellent	excellent	fair
Tonal-correction tools	excellent	excellent	good	fair
Sharpening controls	excellent	excellent	poor	not implemented
Product Details				
Maximum optical resolution (in dpi)	600 × 1200	400 × 800	600 × 1200	600 × 1200
Bits per pixel	12	10	10	12
Maximum reflective image size (in inches)	8.3 × 14	8.5 × 14	8.5 × 11.7	8.5 × 13
Scanning to file	yes	yes	yes	no
Multiframe scanning and batch scanning	yes	yes	yes	no
Descreening while scanning	yes	yes	no	no
Apple scanner emulation	yes	yes	no	no
Scanning software included	FotoLook Photoshop plug-in, FotoLook SA	FotoLook Photoshop plug-in, FotoLook SA, FotoSnap	ScanTastic Photoshop plug-in	ScanMaker III Photoshop plug-in
Color-management software included	FotoTune Light	FotoTune Light	none	Dynamic Color Rendition
Additional software included	Adobe Photoshop	Adobe Photoshop LE, OmniPage Direct	Adobe Photoshop, Kai's Power Tools 2.0	Adobe Photoshop
Suggested retail price	$3495	$1100	$1499	$3499
Transparency adapter price	included	$550	$959	$699
Sheet-feeder price	not available	$600	$499	$499
Phone	508/658-5600	508/658-5600	310/782-0770	310/297-5000
Toll-free phone	none	none	800/289-3776	800/654-4160

[A] See the "Gray Sensitivity" benchmarks for actual test results. [B] See the "Color Variation" benchmarks for actual test results. [C] See the "Scanner Speed" benchmarks for actual test results. to the PowerLook. [E] An alternative ($3695) bundle includes Photoshop LE, PixelCraft ColorAccess, and PixelCraft QuickScan.

resolution figures. This means that the scanner (or the scanning software) looks at the captured pixels and inserts data based on what's already there. And with the exception of some line-art scanning techniques, it's worthless data. Theoretically, you could increase interpolated resolution up to a million dpi and it wouldn't do you any good (but it would swallow hard disks faster than Godzilla eats Tokyo city buses).

Scanning Software

Given that any scanner can provide the resolution and image quality you require, what else should you look for? The following is a summary of the most important features and functions to consider. For my ratings of each scanner in several of these areas, see the table "Scanners Compared."

Speed While speed is most important for high-volume scanning, very slow speeds (especially for prescans) are frustrating even with only a few images to capture. Be aware, though, that some scanning software can handle image-processing work as you scan. Ultimately, that can save you a lot of time in Photoshop—potentially making up for the time spent with a slow scanner.

Previewing Good scanning software provides a large (preferably adjustable) preview window, flexible zooming on the preview (with a higher-res update of the prescan when you zoom in), interruptible prescans (that let you stop once you can see the area you need), and on-screen previewing of corrections in the prescan.

Tonal-Correction Tools The tonal-correction features I look for include support for the scanner's downloadable gamma capability (if it has one); easy control over the gamma curve, white point, and black point (none of the scanners reviewed matches the functionality of the clipping display in Photoshop's Levels dialog box); the ability to create arbitrary curves (with numeric inputs and readouts); a densitometer tool that shows pixel values before and after correction; a good-size histogram display (preferably with sliders for white point, black point, and gamma); and the ability to constrain output values to a selected range.

Sharpening Controls Every image needs sharpening—preferably with an unsharp masking filter—before it's ready for print or display. The standard of reference is Photoshop's Unsharp Mask filter, which offers three adjustments that are all essential to top-notch sharpening.

Scanning to Files or to Photoshop All the scanners reviewed in this article come with plug-in "acquire" modules for scanning images directly into Photoshop (and other programs that support Photoshop plug-ins). Some will scan to a disk file, bypassing Photoshop entirely. Some models also include Additions for Adobe's PageMaker and XTensions for QuarkXPress for scanning directly into those programs. Scanning right onto a layout is only useful, however, if the scanning software provides good tonal-correction and sharpening tools, so the files land on the page ready-to-print.

Multiframe Scanning It's handy to set up multiple images to scan at once, but except for serious production scanning, it's not a huge advantage compared with scanning them one at a time.

Descreening Scanning previously halftoned images can be tough; you almost always end up with patterns due to the conflict between the original screen and the output screen. No piece of software can completely solve this thorny problem, but descreening filters can improve the situation.

Apple Scanner Emulation Some scanners come with software that lets them imitate an Apple OneScanner. This is of interest only if you want to use OCR (optical character recognition) programs, all of which support the Apple scanner.

Bundled Software Some scanners come with the full version of Photoshop, others with Photoshop LE (Limited Edition), which is missing several print-related features—process separation, duotone/multitone mode, the pen tool, and importing of Illustrator files. Other perks might include OCR software or Photoshop filter packs such as HSC Software's Kai's Power Tools.

Color Management Getting grays to look good isn't terribly hard with the right tonal-correction tools, but correcting color casts is quite difficult. Color-management software can help make your scans match the original—reducing the work you have to do and improving quality. No color-management software is perfect, but as you can see from the sample image (corrected with Agfa's FotoTune color-management software) in the sidebar "Evaluating Output," the right software can provide good results.

Transparency and Sheet-Feeder Options With the exception of the ScanTastic software bundled with the Epson, none of the scanning programs support sheetfed image scanning; as a result, sheet feeders are primarily useful for OCR work. Transparency adapters are more widely useful. Bear in mind that with these scanners' relatively low resolutions, you won't be able to produce large output from scans of 35mm slides.

With all those considerations in mind, here's a rundown of the scanners we tested.

Agfa Arcus II

If it weren't for its glacial speed, the Arcus II would be the hands-down winner among the scanners reviewed here. It rated tops in every other area. It pulls great color and gray-scale data, the FotoLook scanning software offers almost all the tonal-correction tools you could ask for, and FotoLook takes full advantage of the scanner's downloadable gamma capability. You can even pull 12-bit gray-scale or 36-bit color data into Photoshop (the full version comes with the scanner) and use Photoshop's tonal-correction tools, if you prefer—something none of the other scanners support.

Also provided is Agfa's FotoTune Light color-management software—a subset of the full FotoTune package. In my review of FotoTune 1.1 in *Macworld*, April 1994, I panned it for its lousy documentation, invisible tech support, and some faulty profiles. But I also said that there is a capable color-management engine lurking inside. You'll need to buy the full $395 package to make FotoTune really useful (so you can build a custom scanner profile, for instance, or use various offset press profiles), but given

Ricoh FS2	Umax PowerLook
excellent	excellent
good	good
excellent	excellent
fair	good
fair	excellent
poor	fair
600 × 1200	600 × 1200
10	10
8.2 × 12.7	8.3 × 11.7
yes	yes
yes	yes
no	yes
no	yes
Cirrus PowerPro (with Photoshop plug-in)	MagicScan Photoshop plug-in
none	none [D]
none	Adobe Photoshop [E]
$2900	$3495
$1050	included
$500	$495
408/954-5326	510/651-8883
800/955-3453	800/562-0311

[D] *At press time, Umax had added color-management software*

that, FotoTune's tight integration into FotoLook makes it a breeze to color correct scans—even converting them to CMYK—as you scan.

Combine this color-management and color-separation ability with FotoLook's sharpening controls (the only ones to match Photoshop's, though like Photoshop's, they are largely undocumented) and you have a beginning-to-end image-preparation engine. If you use FotoLook correctly, the images that come out are ready to be placed in pages and printed; you never need to go near Photoshop.

Unfortunately, it's not always easy to figure out how to use FotoLook correctly. The only way to get at the advanced tonal-correction tools, for instance, is to choose the Set White/Black Point menu option from the Range pop-up menu. Who'da thunk it? And setting resolution using default settings requires that you second-guess the software, which is trying to be smarter than you are.

These problems are surmountable, however, and FotoLook's ability to handle the whole imaging process as you scan goes a long way toward making up for the slow scanning speeds (especially if you use the included batch-scanning application, FotoLook SA). If top quality is what you need, and you're willing to wait for it, the Arcus II can provide it. If speed is more important to you, check out the Umax PowerLook.

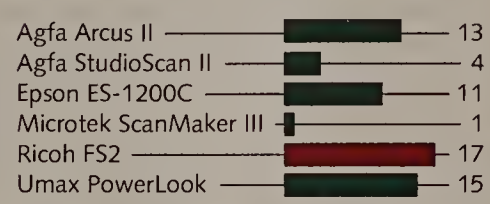
Agfa StudioScan II

Agfa's StudioScan II turned in impressive numbers for color accuracy—second only to the Arcus II—but it rated second to last for gray sensitivity and speed. While its price is attractive, and it offers almost all the software advantages of the Arcus II (discussed above), I'm reluctant to recommend the StudioScan II when its gray-scale scans result in such inferior, impossible-to-correct images, and when they take so darned long to capture.

Gray Sensitivity

We scanned a 37-step calibrated gray wedge and analyzed the scans using NIH Image 1.55 (available free online). We analyzed how many of the distinct gray steps each scanner could discern and how much noise there was in each step. The value you see here is the number of steps each scanner discerned within a given margin of error. Scanners that distinguish between subtle differences (with little noise overwhelming those differences) provide better-quality scans that are easier to correct.

Best result in test.
Longer bars are better.
Products are listed alphabetically.



Epson ES-1200C

The Epson ES-1200C is one of the fastest scanners tested, and it turned in pretty good figures for gray sensitivity and color accuracy. Given its low price, it's a reasonable choice for those who can't afford the (significantly) better quality of the Agfa Arcus II or the Umax PowerLook.

The ScanTastic scanning software (from Second Glance Software) offers an easy-to-use interface (with separate windows for scanning controls, image enhancement, and preview); great previewing (including rescanning at the appropriate resolution when you zoom in or change the preview window size); access to the scanner from almost any Open dialog box (in any application that can open TIFF files); and pretty good tools for tonal correction.

Though you can't enter a simple gamma value for tonal correction, you can adjust a 5-point arbitrary curve (with numeric input and readout), and it's simple to set white and black points. With its Perform in Hardware check box, ScanTastic is the only software to make this option explicit (though when it's selected, you have to repreview to see the tonal changes you've made). There's a densitometer tool, but the histogram is so small as to be useless. ScanTastic's sharpening controls are limited to a single slider, so you're forced to sharpen in Photoshop, and there's no facility for descreening. This scanner pulls usable—if not excellent—scans, however, and it's worth a look for the budget-conscious.

Microtek ScanMaker III

The ScanMaker III rated worse than any of the other scanners on gray sensitivity and color accuracy, and one scan reveals why. All the highlight detail is blown out to white. We tested two units, and they yielded almost identically flawed scans. The situation was not improved by using the Dynamic Color Rendition (DCR) color-management software.

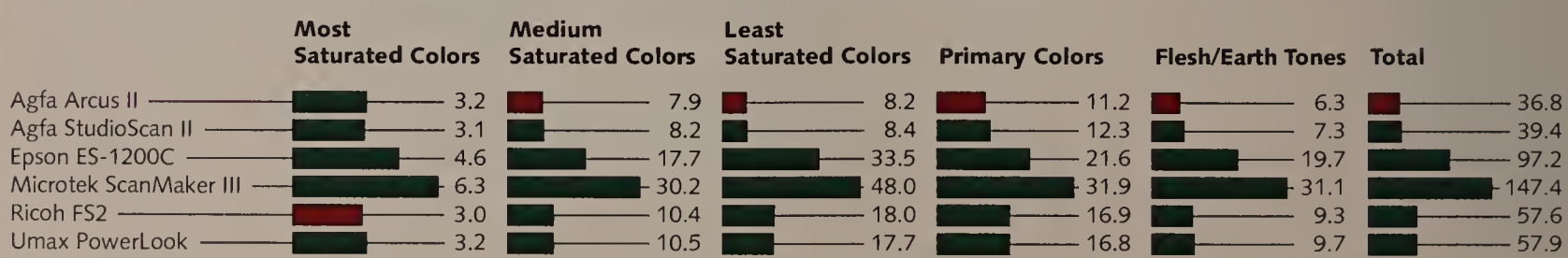
DCR has the distinction of being the only color-management software to work its magic via downloaded gamma curves, so we had great hopes for its ability to match a scan to the original. But images corrected with DCR consistently came out with unnaturally bright, vibrant colors, and this confirmed our impression that the scanner yields excessively brightened images.

Add to this the third-slowest speed rating; mediocre-to-poor zooming; barely adequate tonal-correction tools (no numeric readout in the Curves dialog box,

Color Variation

Best result in test. Shorter bars are better. Products are listed alphabetically. Times are in seconds.

We scanned a calibrated Kodak Q60 color target containing over 200 patches of carefully selected colors on each scanner, and used Agfa's FotoTune color-management package to make each scan as close as possible to the original. We used IPLab from Signal Analytics Corporation to measure the RGB values for each swatch in each optimized color target, then averaged them all to produce a numeric representation of an ideal scan. Finally, we compared the numbers in the uncorrected scans with the ideal scan. The numbers shown here represent each scanner's variation from the ideal. The lower the number, the less variation from the ideal and, thus, the less work required to color-correct images.



In our efforts to provide completely objective representations of each scanner's capabilities, we turned to a color-management application, Agfa's FotoTune, to correct all the sample images for publication in the magazine. To make each scan look as much like the original as possible we used FotoTune's automated correction—avoiding the subjective "we-created-the-best-scan-we-could" approach that pollutes most analyses of image scanners.

We scanned the test photograph (an 8-by-10-inch color glossy) in reflective mode, using all of the hardware advantages available on each scanner—setting the white point and black point appropriately, and adjusting the gamma to a normalized value for each (for the ScanMaker III, we used the included DCR color-management software). We sharpened the images in Photoshop, then corrected and separated them using FotoTune, based on custom profiles built for each scanner setup.

When we pulled film and created proofs of the images, the results were—to say the least—surprising. *The images were almost identical.* While there were minor differences in highlight detail, shadow detail, and color values, the differences were so subtle that they would be virtually undetectable when printed in the magazine.

The image from the Agfa Arcus II shown here is representative of what we got from the whole crop of scanners. Below it is the same image captured on a Crosfield drum scanner by a San Francisco–based prepress firm (scanning charge: $90). While the colors in the drum scan are more faithful to the original, the difference between the Agfa and drum-scanned images is not profound, and shadow and highlight detail are almost identical. Given the poor quality of some of the uncorrected flatbed scans, this speaks volumes for FotoTune's correction and separation prowess. (The differences would be more apparent with an image in transparency format, which has a much higher density range.)

JON DESHLER

Agfa Arcus II

JON DESHLER

Crosfield drum scanner

The results of our tests are likely to make anyone wonder if a scanner's gray sensitivity and color accuracy really matter. In some cases, yes; in others, no. If you're using a reliable color-management system such as FotoTune or the Kodak Color Management System, maybe not much. If you're handling tonal and color correction yourself, however, they matter a great deal, because good scans are easier to get good results from—you don't have to fight with them as much. The bigger lesson is probably this: you shouldn't try to do color correction and separation yourself—at least unaided by color-management software.

For gray-scale work, the scanner's sensitivity matters *a lot,* because tonal correction is in your hands. We were unable to create acceptable gray-scale output from the StudioScan II or the ScanMaker III, for instance, while the PowerLook and Arcus II images were easy to correct. In the ScanMaker III gray-scale scan shown here, the lack of highlight detail is glaring. The PowerLook scan, on the other hand, shows excellent detail in both the highlights and the shadows.

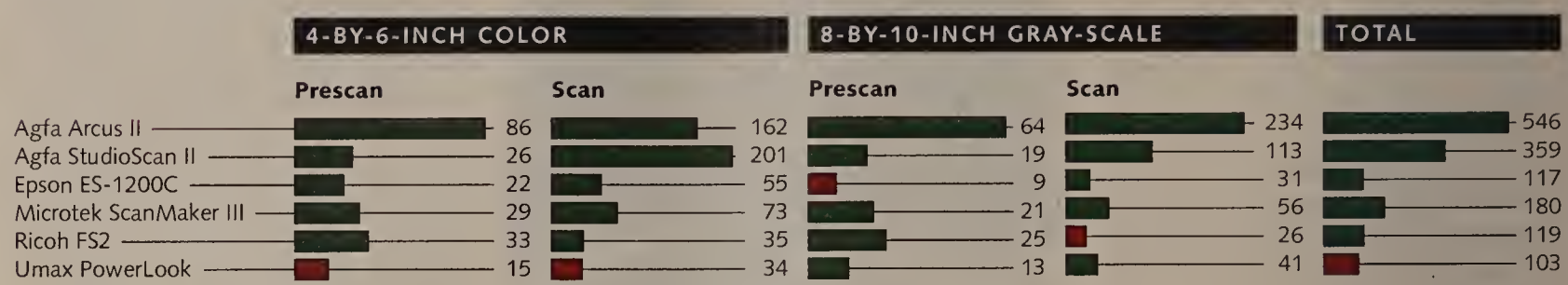
Umax PowerLook

Microtek ScanMaker III

Scanner Speed

Best result in test. Shorter bars are better. Products are listed alphabetically. Times are in seconds.

We prescanned and scanned a 4-by-6-inch color image and an 8-by-10-inch gray-scale image, both at 200 dpi. The numbers represent the average of three passes for each scanning test.



BEHIND OUR TESTS All tests were performed using the settings that gave the best color accuracy from each scanner. We tested the scanners with a Macintosh Centris 650 with 24MB of RAM and a 230MB internal hard drive. We used an Apple 16-inch color display and a SuperMac ThunderIIGX 24-bit graphics card with bit depth set to 24. We allocated extra memory to Adobe Photoshop 3.0 to ensure that disk access wouldn't affect our speed tests.—**Macworld Lab testing supervised by Mark Hurlow**

no densitometer tool, no control over output value range); and no sharpening, descreening, batch, or multiframe scanning; and you've got a scanner I simply can't recommend. (A new version of Microtek's plug-in, to be released in February, will provide batch and multiframe scanning and a descreening filter, and will incorporate Kodak's color-management engine into DCR.)

Ricoh FS2

The Ricoh FS2 turned in impressive numbers for gray sensitivity, color accuracy, and speed. But the third-party scanning software provided (Cirrus PowerPro, from Canto Software) doesn't tap those powers effectively.

The biggest problem with Cirrus is that it doesn't show the effect of changes in the prescan. You prescan, change settings with no visual feedback (you can't even see before and after values with the densitometer), and then rescan to see the effects. You can apply all the changes to a scanned image after you have captured it, but you are not tapping the downloadable gamma capability, so you might as well do that in Photoshop, which has better tools (though it is not provided with the scanner). You can scan at low resolution, make changes with live updating, *write down the settings*, then go back and apply them to a high-res scan; but it's hardly efficient.

At first glance, the FS2 might appeal to those looking to save money. While it costs $600 less than the Agfa Arcus II and Umax PowerLook, those scanners are, in fact, better deals. Unlike the FS2, they each include a transparency adapter and the full version of Photoshop; just adding a transparency adapter to the Ricoh scanner ($1050) puts it well beyond the cost of the Agfa and Umax models.

Umax PowerLook

The PowerLook is head-to-head with the Arcus II for the top pick in this roundup. The PowerLook doesn't offer quite as good gray sensitivity or color accuracy; it provides no color-management software; and its sharpening controls aren't up to snuff (the only unsharp mask settings are high, medium, and low). But the PowerLook generates very good scans and offers excellent tonal-correction tools that take full advantage of the scanner's downloadable gamma correction. In overall scoring, it's the fastest scanner in the bunch.

The MagicScan software has one key failing: zooming on previews. When you zoom in, the software merely enlarges the low-res preview rather than rescanning. You have to adjust the preview frame manually and repreview to get a high-res zoom and you must resort to a submenu of the File menu to zoom back out.

There's a dialog box similar to Photoshop's Levels dialog box, and there's an arbitrary Curve dialog box (with numeric readouts but no numeric inputs). Unlike the Agfa software, MagicScan doesn't download this arbitrary curve; it essentially applies a postscan filter—in addition to the hardware gamma correction—as the 8-bit data comes in. Other features include an easy-to-navigate interface for batch and multiframe scanning and a descreening filter that works as well as these filters can be expected to work.

At press time, Umax had released new software for the PowerLook that includes (among other things) the ability to pull 10- or 30-bit data into Photoshop, improved zooming on previews, and Umax's MagicMatch color-management software.

The Last Word

I wish that I could wholeheartedly recommend one of the lower-cost scanners, and the Epson comes close—limited by its less-than-stellar performance in gray sensitivity and color variation. But the real choice in this roundup is between the Umax PowerLook and the Agfa Arcus II. And then, it's a question of a noticeable but small quality difference and a major speed difference (obviated to some extent by the Arcus II's full-featured correction tools). You should choose the Arcus if you are really going to tap those tools to automate scanning and correction. If you plan to do most of your correction in Photoshop anyway, the faster PowerLook is a better choice. m

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Contributing editor STEVE ROTH is coauthor of *Real World Scanning and Halftones: The Definitive Guide to Scanning and Halftones from the Desktop* (Peachpit Press, 1993).

HIGH-BIT SCANNERS

Two of the more expensive scanners lead the pack, though the less-expensive Epson ES-1200C might be sufficient for those on a limited budget.

Arcus II Top ratings in every category except for speed, plus full-featured software, make this a winner. But the scanning speed is execrable. **Company:** Agfa. **List price:** $3495.

PowerLook This scanner turned in good or excellent ratings in almost every category, it's blazingly fast, and its software is a pleasure to work with. **Company:** Umax. **List price:** $3495.

Color is color, unless you want performance *and* price.

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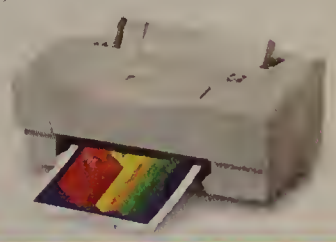

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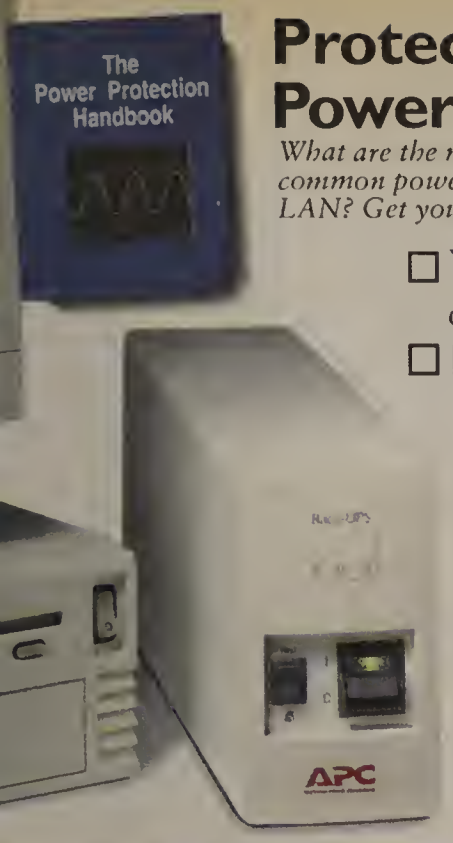

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HOW DO THE NEW-GENERATION PROGRAMS COMPARE? HAVE THEY GOTTEN TOO BIG? MACWORLD LAB FINDS OUT.

Word Processing Powerhouses

MW LAB

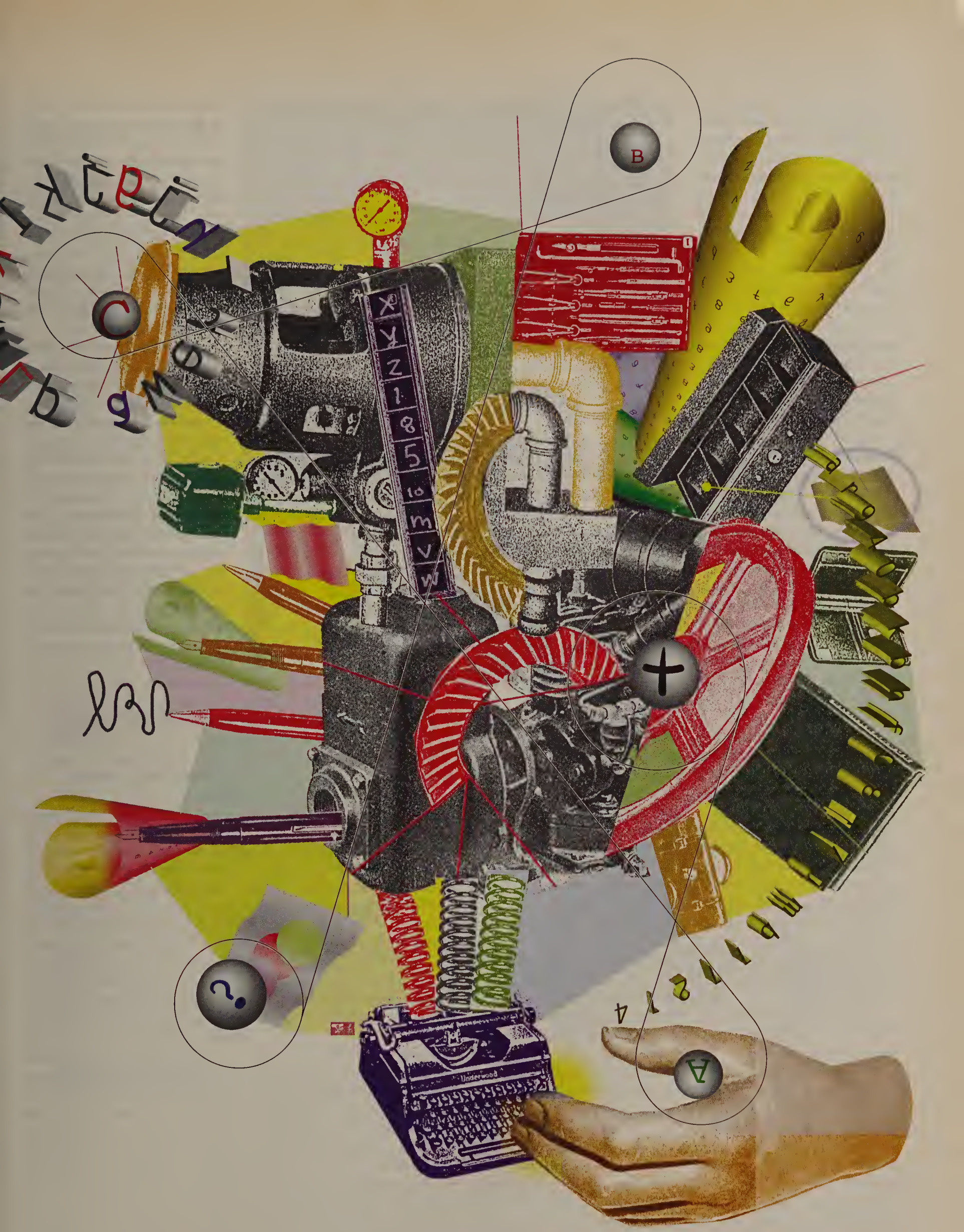
BY ROBERT C. ECKHARDT

You've seen the headlines, heard the debates, read the letters to the editor: Microsoft Word 6 is slow as molasses! WordPerfect 3.1 is faster! Word 6 users are going back to Word 5.1! Nisus Writer 4 is better! Word 6 has everything a writer could want! What are the facts behind all the commotion? Which, in fact, is the best of this new crop of high-end word processors?

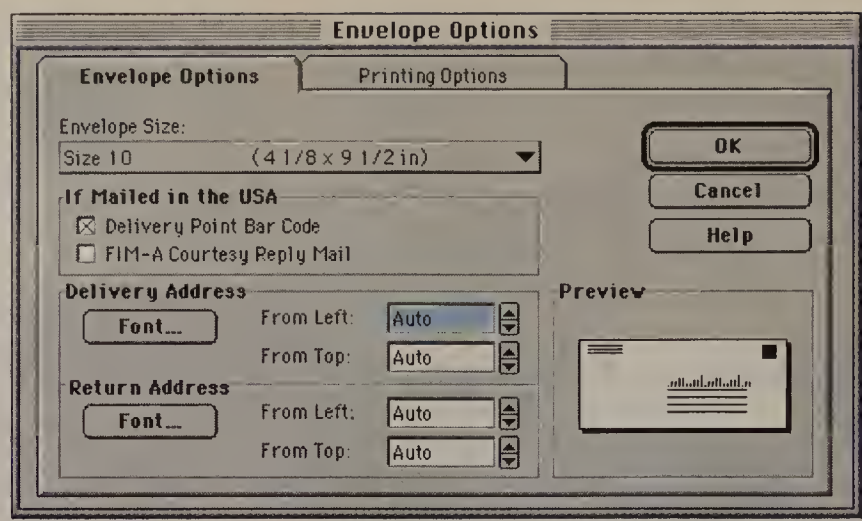
Making that call is not easy. Today's high-end word processors are among the most complex software products you'll encounter—unless, perhaps, you do maintenance on the space shuttle or operate an atom-smasher. And, as with repairing a spaceship or smashing atoms, when you need to perform certain sophisticated word processing tasks there is no substitute for the right tool. But to find the right tool—to get the half-dozen task-specific, high-end features that your word processing demands—you have to sort through, and buy, several hundred other high-end features that you don't need.

This article will help you make sense of the subtle differences between Word, Nisus Writer, and WordPerfect by grading their important features so that you can find the capabilities you really require. If your word processing needs are more modest, we also have information to help you choose among several less-complicated word processing packages—see the accompanying article, "Lean Writers."

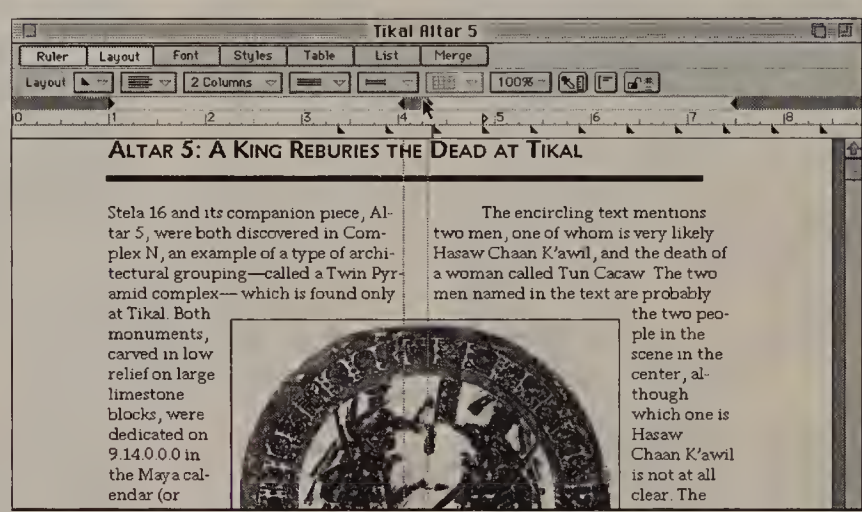
To put it in a nutshell, Microsoft Word 6.0 (street price about $325, Microsoft Corporation, 206/882-8080, 800/426-9400) delivers a raft of new features that beat the pants off its competitors, but the program's speed on all but


B
C
A
Underwood

the fastest Macs raises troubling questions. Nisus Writer 4.0 ($495, Nisus Software, 619/481-1477, 800/922-2993) and WordPerfect for Macintosh 3.1 ($395, Novell WordPerfect Applications Group, 801/225-5000, 800/451-5151) are significantly less radical departures from their forebears and significantly less powerful than Word 6. Nisus Writer performs some tasks especially well and others very poorly, while WordPerfect almost never turns in a memorable performance, yet only rarely ends up in last place.



Take a Letter When you open the Envelopes and Labels dialog box, Word inserts the address for the letter you're writing. Word can also print the appropriate bar code on the envelope, offers standard envelope sizes, and remembers your return address.



Columns Are a Drag In WordPerfect you can easily change column widths by dragging the column marker on the ruler, or you can change the number of columns with the Columns pop-up menu on the Layout tool bar. But because there's no easy way to balance column lengths in WordPerfect, mixing different numbers of columns on a single page is a real juggling act.

Basic Tools

Some things will strike you the moment you start using each program. First, all three are memory hogs, with a preferred RAM partition of 3MB. Nisus Writer fills more than 6MB of hard disk space, WordPerfect about 9MB, and Word 25MB or more (4MB for the program alone), though, of course, you can limit the damage by not installing templates and other useful extras.

In day-to-day operations, Nisus Writer remains a curious mix of bad design (deeply buried open-windows list, far too many submenus, ten—count 'em—preferences dialog boxes) and good design (noncontiguous text selections, a ten-part clipboard). In Word, you can add multiple items to the Clipboard, but when you paste, there is no way to paste a single item—Word spits out everything the Clipboard holds.

Word 6 is less an upgrade from Word 5.1 than it is a brand-new program; it is, in fact, Word for Windows 6.0 running on the Mac. It has a new look, completely reorganized menus, new keyboard shortcuts, new commands, and different dialog boxes (though it still has way too many of them). Word can now undo and redo up to 100 actions and it's the first high-end word processor that makes printing envelopes a snap (see "Take a Letter").

But you'll have to adjust to the disappearance of some memorable Word 5.1 features, such as the Work menu, the Section command, the Apply button in many dialog boxes, the ability to add columns of figures quickly anywhere in the text, and the use of menus and rulers to specify options in open dialog boxes. You'll have to adjust to a few unwelcome additions imported from Windows as well, such as the convoluted DOS-like way you change the cache and other advanced settings. And if you're a System 6.0 holdout, you'll need to switch to System 7.

WordPerfect doesn't provide any particularly notable basic features, except, perhaps, the cleanest, least cluttered, most direct interface. It is also the only program that supports System 7.5 drag and drop. (All three programs support drag and drop in the same document, and Word and WordPerfect support drag and drop between their own documents. For drag and drop between applications, WordPerfect requires System 7.5, and Word requires Microsoft's OLE extension, which comes with Word and enables drag and drop among Word, Excel, and PowerPoint.)

THE BASICS: MSW, B; NW, B; WP, B

Learning Tools

Learning the new versions' new features can be a chore, especially as the documentation for all three programs is less than ideal. Worst of the lot is Nisus Writer, whose five manuals total over 1100 pages and lack a unified index. Two Nisus manuals cover much of the same material, so you have to look in both for many topics, and some areas receive barely a mention while others get more than their due. Still, Nisus is the only one of the three that comes with a manual for macros. WordPerfect has managed to keep its documentation to 537 pages; overall, it's a competent effort that falls short a bit too often. Word's 1059 pages of manuals, although the best of the lot, are larded with confusing Word for Windows material and, despite the length, have noticeable lapses as well.

Most of the information missing from the printed manuals is covered in extensive on-screen help in all three programs. Only WordPerfect has adopted System 7.5's Apple Guide, but Apple Guide's lead-you-by-the-hand demonstrations are not much in evidence in this first try. Only Word has Help buttons, sometimes helpful, sometimes not, in virtually every dialog box, as well as a Help pointer that takes you directly to the appropriate help screen. Regrettably, all three on-screen help systems lack cross-references to the relevant pages in the manuals.

DOCUMENTATION: MSW, B; NW, C; WP, B–

Document-Creation Tools

Whether you're writing a maintenance manual for NASA or a two-page summary of ancient Mesoamerican civilizations, high-quality tools are essential for creating your document and controlling its structure and format.

Word is the only one of the three programs with an integrated outliner, and the way it ties together virtually all the elements and formatting of a document makes outlining one of the program's most valuable features. In Word, every document harbors an outline at its core. You can display it at any time, and you can use it to expand or collapse parts of the document and move them around at warp speed. You can reorganize Word's tables in a flash using outlining tools; the outline headings automatically convert to properly formatted section titles when you return to

text view—the versatility of Word's outliner extends in many different directions.

Style sheets are also one of Word's strong points, especially now that Word 6 has both paragraph and character styles. Word can choose and apply styles for you (though not always with aesthetically pleasing results) from its extensive collection of style-sheet templates, and it has a pointer tool that you can use to copy and paste styles and other formatting. WordPerfect's style sheets don't support character styles and are the least satisfactory.

Word and Nisus Writer have easy-to-use glossaries—a place to store reusable bits and pieces of text or graphics. (WordPerfect's styles can perform a similar function, but not nearly as well.) Nisus Writer includes a full version of Design Science's equation editor, MathType; Word includes a scaled-down MathType; and WordPerfect includes an equation editor that it developed and that is less powerful than MathType.

Nisus Writer also has formidable foreign-language skills. For example, it can mix right-to-left and left-to-right scripts, and it has right-to-left rulers and footnotes. But it lacks one foreign-language feature that Word and WordPerfect have: a way to indicate the language of roman-alphabet text so that the program uses the correct dictionary, hyphenation file, and thesaurus automatically.

DOCUMENT-CREATION: MSW, A; NW, B; WP, C

WORD 6 IS LESS AN UPGRADE FROM WORD 5.1 THAN IT IS A BRAND-NEW PROGRAM; IT IS, IN FACT, WORD FOR WINDOWS 6.0 RUNNING ON THE MAC

Editing Tools

All three programs come with an arsenal of editing tools—search and replace, spelling checker, thesaurus, hyphenation, word count, grammar checker—to help you revise and correct your work.

With a vast array of search operators and wild-card characters, Nisus Writer's search and replace can find almost anything—character formats, paragraph rulers, even graphics—in any number of documents at once, and it can replace or reorder all or just parts of the found text (see "A Few Top Features"). Nisus Writer actually provides three levels of search and replace, ranging from a very accessible version for basic users to a text-programming language called GREP (Global Regular Expression Parser). Nisus Writer also has a convenient command to strip out the annoying characters that mess up downloaded text files.

Although not as powerful as Nisus Writer's, Word's find and replace is no slouch either. It lists formats clearly in the Find window, which makes it

MW LAB Word Processors: Which Is Fastest?

Best result in test. Shorter bars are better. Products are listed alphabetically. Times are in seconds.

	Launch Program and Open File	Scroll	Find and Replace	Change Fonts	Count Words	Print to PS file
Low-End Programs						
LetterPerfect (Centris 650)	7.7	20.9	5.9	14.8	11.3	78.5
MacWrite Pro (Centris 650)	11.9	24.4	4.4	4.8	33.9	79.6
Nisus Compact (Centris 650)	21.9	12.5	2.3	3.9	3.0	75.1
WriteNow (Centris 650)	6.6	19.7	1.8	3.4	3.2	60.7
High-End Programs						
Nisus Writer 4.0 (Mac IIci)	42.4	36.8	6.9	8.5	4.8	196.2
Nisus Writer 4.0 (Centris 650)	22.3	13.4	2.9	4.3	2.7	76.5
Word 5.1 (Centris 650)	13.1	10.2	3.0	2.2	6.2	77.3
Word 6 (Mac IIci)	30.3	46.6	9.1	3.8	76.7*	464.2
Word 6 (Centris 650)	19.7	18.2	3.3	2.7	35.7*	152.9
Word 6 (Power Mac)	24.5	12.1	2.2	2.3	30.1*	293.3
WordPerfect (Mac IIci)	18.8	59.5	22.1	44.4	31.1	264.3
WordPerfect (Centris 650)	14.9	20.8	8.1	14.6	10.0	76.9
WordPerfect (Power Mac)	17.0	16.4	4.7	9.0	5.7	167.7

*Exact word count, not preliminary estimate.

BEHIND OUR TESTS

Macworld Lab tested word processing functions that writers perform frequently. Two of the tests, launching the programs and converting a file to PostScript format, are I/O-intensive, while the scrolling, find-and-replace, font-change, and word-count tests are more CPU-intensive. The difference is significant because Apple has not released the I/O parts of the Mac Operating System in native Power Mac format—that's why both native Power Mac word processors, Word 6.0 and WordPerfect 3.1, perform those tasks much more slowly on a Power Mac than their 680X0 versions do on a Centris 650.

Beyond the predictable I/O performance, no real pattern emerges—test results are all over the map. For example, WriteNow comes in fastest on three of the six tests, while last year's model of Word, version 5.1, takes the prize on two tests. Word 6 on the Power Mac is almost as slow at both I/O tasks as it is on the IIci, yet it runs a close second on three of the four CPU-intensive tests—and performs miserably, along with Word 6 for 680X0, on the fourth, the word-count test.

Limited memory, improper use of virtual memory, improper cache settings, extensive font libraries, and other factors can have a severe impact on the launch time for Word 6 on the Power Mac—our test conditions can be considered a best-case scenario (for more on bottlenecks, see "Power Mac Software Soars," in this issue).

Our Mac IIci, Centris 650, and Power Mac 7100/66 all had 8MB of RAM and a standard System 7.1 installation with no extra extensions. Not all products were tested on all platforms. The test file was a 44-page, 9000-word chapter from a technical manual with complex formatting, many illustrations, and tables.—**Macworld Lab testing supervised by Lauren Black**

easier to find and replace them in Word than in Nisus Writer. Nisus Writer, on the other hand, provides a more comprehensive set of wild cards and operators, and they are

WORDPERFECT DOESN'T PROVIDE ANY PARTICULARLY NOTABLE BASIC FEATURES, BUT IT PRESENTS THE CLEANEST, LEAST CLUTTERED, MOST DIRECT INTERFACE

easier to use than in Word. WordPerfect, with only two wild-card characters to its name, has by far the weakest search function.

Although its dialog box is a prime example of poor design, the Nisus spelling checker is overall the best of the three: it's fast, it automatically displays suspect words in context, and you can run it entirely from the keyboard. WordPerfect's spelling checker gets the lowest marks: you can't run it solely from the keyboard, and it doesn't always display suspect words in context.

Grammar checkers have never impressed me much, so the absence of one in Nisus is not, in my book, a serious omission. Word's grammar checker is easier to use than WordPerfect's Grammatik 5, but Grammatik 5 (which was also sold separately until WordPerfect released version 6) has more depth and flexibility. I've never found an electronic thesaurus very useful either, but if I had to choose one, I'd choose the one in Nisus Writer. Word has the most flexible and comprehensive hyphenation feature, and Nisus, the least. And only Word can count the words in a selection as well as in a whole document, though its word-count feature is incredibly slow even by Word's standards (see "Word Processors: Which Is Fastest?").

EDITING TOOLS: MSW, B+; NW, B+; WP, B–

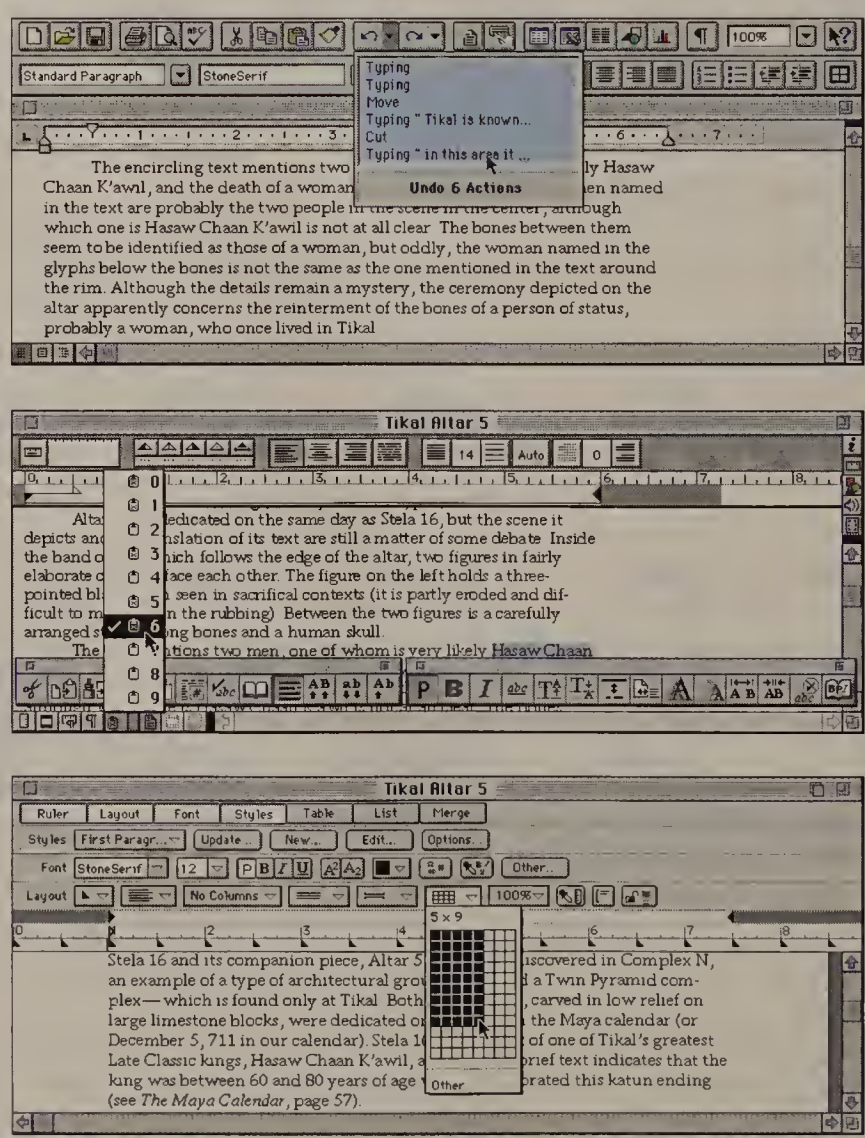
Automation Tools

Performing complex, boring, or repetitive word processing tasks is the bane of any serious writer. To save you time and aggravation when your word processing borders on data processing, the three heavyweight word processors provide ways to perform many tasks quickly and easily or even automate them. All three programs, for example, have button bars or floating tool palettes, add and remove spaces as needed when you cut or paste text, and use smart quotes (see "Tools of the Trade"). Word and WordPerfect can correct common errors such as transposed letters, common misspellings, extra spaces, and incorrect capitalization as you type—you can even customize the corrections so that when you type an abbreviation the program spells out the full word.

Word, however, is the only one of the three that has taken a serious stab at making its cornucopia of features easier to use. For example, Word's tool bars display a pop-up description of what each tool does, you can completely reorganize tool bars and menus for easier access, and pop-up menus appear when you click on many document elements. Word can automatically format tables, and of the three programs it has the most intelligent automatic list-numbering feature. Most unusual, however, are Word's Wizards, which automate tasks such as writing a résumé or producing a table by quizzing you about your goals. Though far from perfect, Wizards and automatic formatting are a tantalizing first attempt at a new kind of intelligent assistance.

Macros are the ultimate way to automate tasks, and all three programs contain comprehensive, if rather daunting, macro languages. All three have a watch-me macro-recording mode. Word's is the most intelligent—for example, if you select the Replace command, it knows you need to clear any previously entered formats and enters the appropriate command for you. Word makes editing recorded macros the easiest, and its macro button bar is especially helpful for this. The macro language in Word is actually Word Basic, similar to but, unfortunately for integrators, not the same as Visual Basic for Appplications, Excel 5.0's new macro language.

Nisus has a two-tiered macro language: a less capable dialect that the technically disinclined should find somewhat easier to work with, and a full-featured programming dialect. Its watch-me mode is the least intelligent—it cannot recognize selections from pop-up menus, for example, and it records a mouse-click by screen coordinates instead of by the option or command you are selecting—but Nisus comes with the greatest number and variety of useful, ready-to-use macros. WordPerfect's ability to switch back and forth between the watch-me recorder and the macro editor is very useful. Managing macros—renaming them,



Tools of the Trade

Word 6, Nisus Writer 4, and WordPerfect 3.1 all provide well-stocked tool bars. **Microsoft Word (top):** A pop-up list lets you undo with one click a series of steps you've performed recently. **Nisus (middle):** From this pop-up menu you can copy to or paste from any of Nisus's ten independent clipboards. **WordPerfect (bottom):** Three of WordPerfect's seven tool bars. The bottom tool bar, Layout, has a graphical command for setting the rows and columns of a table.

moving them, assigning key commands, and so on—is unnecessarily difficult in all three programs.

Mail merge has always been a big thorn in the side of anyone producing form letters and other standardized documents. Unfortunately, Nisus continues the tradition with what is, by today's standards, a very old-fashioned merge feature: you must enter all field names, field markers, and merge commands entirely by hand. If the thought of doing a mail merge makes you queasy, don't even think about doing one in Nisus Writer.

WordPerfect has heard the howls of mail merge protest and done something about it. Once you specify your data document, for example, you can select field names from a pop-up menu (though the menu is inconveniently located in a dialog box). You can also select other merge commands from a pop-up menu, including prompting for keyboard input or running a macro. Creating the data document isn't much different than in Nisus, however, and parts of the merge process (such as replying to some user-specified prompts) can be pretty awkward.

If you find mail merge intimidating or can't be bothered with the details, Word's Mail Merge Helper is the answer to your prayers. The Helper leads you through creating the data- and form-documents step-by-step, carefully explaining the process for form letters, envelopes, address labels, and catalogs, and putting everything you need for the job, such as field names and merge commands, within easy reach. Then, unlike Nisus and WordPerfect, Word can check form- and data-documents for errors and help you resolve any problems. It can quickly display how a merged document will look on screen, using any record you choose, and can filter and sort the data to merge only the records you want and in the order you want them.

AUTOMATION: MSW, A–; NW, C; WP, B–

A FEW TOP FEATURES

As we explored the high-end word processors' labyrinthine lists of features, Microsoft Word and Nisus Writer each demonstrated a few capabilities that stood out as the best conceived, best designed, or just plain most useful. WordPerfect, true to its middle-of-the-road nature, didn't really do anything impressive enough to be highlighted here.

Microsoft Word

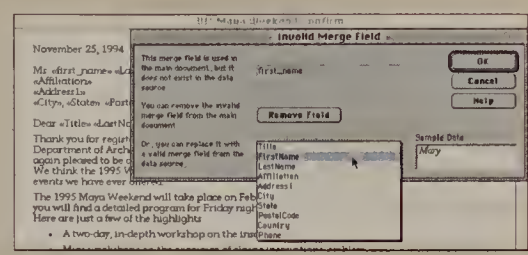
Outlining No other high-end word processor has true outlining that can manage so many other aspects of the document—table of contents, formatting, and so on. Writers who ignore its outliner are wasting Word's power.

100 Levels of Undo Word can undo up to 100 past actions in one stroke and describes those actions in a scrolling list—much better than Nisus's undo and redo, which, though unlimited, reverses only one action at a time.

Styles The addition of character styles in Word 6 makes Word's styles the most powerful formatting tools in any word processor, although not always the easiest to use.

Mail Merge Word's Mail Merge Helper guides you through the entire process and helps you if you make a mistake (see "Sorry, Wrong Number"). It contains a mini database for mail merge information and is intelligent enough to delete blank lines produced by missing information.

Envelope Printing Word prints envelopes with return addresses and bar codes almost effortlessly.



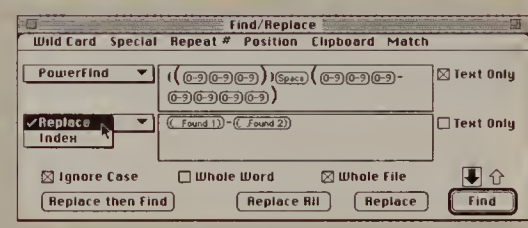
Sorry, Wrong Number Microsoft Word can run a test mail merge, report errors, and help you fix the problem. Here, for example, Word has found a merge field in the form document that doesn't occur in the data document, and offers to delete the field or replace it with a valid one selected from its pop-up list.

Nisus Writer

Speech Synthesis Nisus Writer can read documents aloud—it's a great way to check for mistakes that elude the eye. It can correctly pronounce English, French, Spanish, German, and Italian; and it supports Apple's PlainTalk.

Search and Replace Nisus Writer's search function almost has to be seen to be believed (see "Power Replace"). It can, for example, update the area codes in a list of addresses based on their zip codes, or locate all European-order dates and convert them to American-order dates.

Ten Clipboards A pop-up menu shows which clipboard is active, shows which ones are empty or full, and allows you to switch between them.



Power Replace Nisus Writer's midlevel search mode displays wild cards and operators as boxed phrases (in Word they appear as codes, which makes them more difficult to use). Here the Find/Replace has been set up to remove the parentheses around area codes (indicated by numeral wild cards) and insert a dash instead. Nisus Writer can also mark found words as index entries.

Noncontiguous Selection Nisus Writer can select multiple pieces of text anywhere in the main document. It can also select all occurrences of anything found with search and replace.

Multiple-Key Commands Nisus Writer can create key commands that combine up to three letters with the standard modifier keys, vastly increasing the number of possible commands and making them much easier to remember.

Long-Document Tools

If you are writing the next great science-fiction epic or some other long and complex document, you'll need capabilities that the average single-page-memo blaster is blissfully unaware of—capabilities such as indexing, generating tables of contents, cross-referencing, and footnoting.

For footnotes and endnotes, Microsoft Word is the best choice: it applies styles more intelligently, it allows you to edit footnotes right on the page, and it offers the widest variety of standard numbering schemes. Nisus Writer, on the other hand, is the least helpful with footnotes and endnotes, and it doesn't allow you to use both in the same document.

Word is also the best choice for tables of contents. If you create an outline to organize your document, Word can create a table of contents many levels deep based on the outline headings. If you use styles other than outline heading styles to format section titles, Word can compile a table of contents based on those styles. Or you can embed table-of-contents codes in the document, a process that Word's Field command partially automates.

WordPerfect can create tables of contents of up to five levels; Nisus Writer can generate only single-level tables of contents. Oddly, though Nisus can automatically number chapters, sections, and subsections, its table-of-con-

tents feature ignores those headings, unless manually marked. Word and WordPerfect also easily generate tables of authorities, lists of figures, and other lists; doing so in Nisus Writer is especially laborious.

No word processor makes indexing easy. Nisus Writer generates only simple, single-level indexes, but it can help you create the index by compiling a list of all words in a document and then marking index entries for you based on those words—after you have carefully winnowed the list by hand. Although both Word and WordPerfect can use a word list to mark index entries, neither can create the list. WordPerfect can compile two-level indexes; it cannot, however, generate indexes in the common *Chicago Manual of Style* format. Word's indexer is the most versatile of the three. It can create indexes with as many as nine levels, can add cross-references (such as "See . . ."), and offers the widest variety of standard index formats.

Compared with indexing, cross-referencing should be pretty straightforward, but Nisus Writer and especially WordPerfect make it remarkably difficult. Only Word makes it as easy as choosing an item from a list.

WordPerfect also complicates things unnecessarily by creating and updating all lists, indexes, and cross-references with a single command, thus making it easy to accidentally overwrite manual editing or formatting in one list when creating or updating another. Word, on the other hand, not only creates and updates each list separately, but also can update just the page numbers in a table of contents so that you don't lose manually applied formatting in the contents section.

Finally, for long publications that are logically composed of more than one document, such as a book divided into chapters, Word has a unique feature called a master document. In a master document's normal view, you can see and work on the contents of the entire publication. In a master document's outline view, you can divide the publication into smaller subdocuments and easily reorganize the contents of the publication regardless of subdocument boundaries. Most important, Word keeps track of page numbers; maintains cross-references; and compiles indexes, lists, and tables of contents across all the subdocuments of the master document.

LONG DOCUMENTS: MSW, A–; NW, C; WP, C+

Design Tools

All three programs have tools for embellishing documents with graphics, adjusting type, and laying out pages. WordPerfect offers the widest variety of drawing tools, including a Bézier-curve tool, but in contrast to Word and Nisus Writer, WordPerfect makes you draw in a separate window, which makes it difficult to judge how graphics and text will fit together.

WordPerfect can flip text in a graphic and rotate it in 1-degree increments, while Nisus Writer can only rotate graphic text by 90 degrees. Word can flip and free-rotate text in its new WordArt module, which can also create special text effects such as text arcs, circles, waves, wedges, and shadows.

All three of these programs can wrap text around graphics and place graphics in front of text or behind it. WordPerfect's Watermark command makes the latter especially easy, but screen-redraw problems make word wrap a rather messy affair on screen. All three programs import graphics in standard formats, as well as QuickTime movies; Word and WordPerfect come with modest selections of clip art.

Variable-width newspaper-style (snaking) columns and different column formats on the same page are available in Word and WordPerfect, but working with multiple-column formats is far easier in Word (see "Columns Are a Drag"). Nisus Writer, at the opposite extreme, restricts you

FULLWRITE FULFILLED?

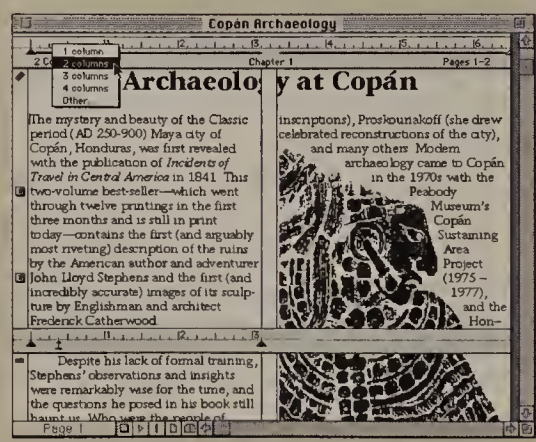
FullWrite was supposed to be the Microsoft Word–killer—back in the days of Word 3.05. But a cash crunch, bad business management, and plain bad luck overwhelmed FullWrite and it dropped off the radar screen several years ago.

Now FullWrite is back, revised and rewritten by Akimbo Systems (version 2.01, $395, 617/776-5500), though we received the new version too late to test or to cover in the main story. FullWrite offers many standard high-end features: multilevel tables of contents and indexes; cross-references; as-you-type typo correction; glossaries; footnotes and endnotes; spelling checker and thesaurus; equation editor (MathType); and a basic, built-in drawing program.

Like Rip Van Winkle, however, the reawakened FullWrite is a bit behind the times. It has no tool bars, no format options available from the ruler, no information-packed status bar, no grammar checker, no zoom, and no menus of recently opened files. It can't create tables of authorities, lists of figures, and the like; doesn't support drag and drop between documents or applications; and has limited multicolumn abilities (see "It's a Wrap").

FullWrite's style sheets support both paragraph and character styles but are inflexible and less powerful than Word's, as are its revision-tracking abilities. The new table editor, the mail-merge feature, and find-and-replace function, which offers only two wild cards, are all pretty pedestrian.

On the other hand, FullWrite is still the only high-end word processor that can wrap text around an irregularly shaped object (again, see "It's a Wrap"). It has a unique keyboard-based menu-navigation system and a simple bibliography feature that can help standardize citations and organize references. Its integrated outliner, while less powerful than Word's, is quite serviceable. You can display and edit facing pages, and at 760K for the application and 2MB for the preferred RAM partition, FullWrite is now the leanest high-end word processor.



It's a Wrap To mix column formats or create columns of unequal width on one FullWrite page, you must put elements in sidebars—that is, boxes. For example, the title "Archaeology at Copán" is in a separate box, visible only when that text is selected. FullWrite can wrap text around irregularly shaped objects, and uses paragraph rulers much like Nisus Writer's.

Overall, other word processors have largely caught up with FullWrite's early lead in page-layout features. Like WordPerfect, FullWrite 2 is a decent, middle-of-the-road program and worth considering primarily if your Mac lacks the horsepower to run Word 6.

to columns of equal width and only one column format per document, and you can't edit in the only view that displays multiple columns. Word and WordPerfect can also affix captions to figures, tables, and other items—Word a bit more flexibly—and create text boxes for pull quotes and the like.

NISUS WRITER, WITH ITS VAST ARRAY OF SEARCH OPERATORS AND WILD-CARD CHARACTERS, CAN FIND AND REPLACE ALMOST ANYTHING

Word is the only high-end word processor that allows you to edit text and graphics in a view that shows how the document will look when printed. You can zoom in for detail work and zoom out to view your document as a screenful of fully editable thumbnails, where drag and drop becomes truly useful. Word also has special items for electronic forms such as purchase orders, with fields that accept only certain entries (such as dates), clickable check boxes, and pop-up menus that list all available choices. Word and WordPerfect support QuickDraw GX, which allows you to change settings, like page orientation, on a page-by-page basis.

DESIGN: MSW, A–; NW, C; WP, B

Table Tools

If you frequently present information in table form, forget about creating columns with the tab key: what you need is a table editor, which all three programs offer.

Nisus Writer's table editor, which is a version of Macreations' Tycho TableMaker, has some very helpful features, such as commands for reversing the order of rows or columns and transposing rows and columns. But it also has a major, indeed a fatal, flaw: it cannot create tables longer than a single page. That, combined with the fact that Tycho's tables are not Nisus documents, which prevents you from using Nisus Writer's powerful editing features, mark text in tables for an index entry or a cross-reference, and so on, makes Nisus Writer's table abilities thoroughly unsatisfactory.

Word and WordPerfect, on the other hand, can create tables spanning multiple pages, automatically repeat column headers at the top of each new page, and perform spreadsheetlike calculations. Word's table editor, while not always easy to use, is certainly the most powerful, and the table Wizard and the AutoFormat and AutoFit functions alleviate many ease-of-use issues.

TABLES: MSW, A; NW, D; WP, B

Tools for Workgroups

If you share your workload with others, you'll need to be able to exchange documents with people who may be using a different Macintosh word processor or a DOS or Windows word processor.

Word reads and writes a wide variety of file formats, including other Microsoft application formats for the Mac and PC, RTF, RFT-DCA, MacWrite II, and WordPerfect for DOS and Mac. WordPerfect supports WordPerfect formats from the PC and other platforms, RTF, and MacWrite and WriteNow formats. It can also read Word files if Apple's Easy Open is installed (WordPerfect comes with a copy). Nisus Writer can import and export in any format for which there is an XTND-compatible translator (the program comes with translators for MacWrite II, RTF, and Word 4 and 5 only); and because Nisus files look like raw text files to other applications, just about any application can open Nisus files, though, of course, you'll lose all formatting.

Virtually all page-layout programs support Word's file format, and many are now adding WordPerfect's as well. Other programs largely ignore Nisus Writer's file format, though Nisus does provide a PageMaker filter.

For workgroups, Word's new revision, review, and annotation system can't be beat. You can view all annotations, for example, or just those made by one colleague. Word keeps track of all changes made to a document; clearly displays what has been added, deleted, and moved; and marks each change according to reviewer, date, and time. Word can compare different versions of a document, and when editing is complete, you can accept or reject changes globally or one at a time.

For those who must switch back and forth between Mac and Windows, Word again has no peer, since the two versions use an identical file format.

WORKGROUPS: MSW, A–; NW, C; WP, B

The Last Word

Overall—ignoring serious issues of performance—the new Word has actually widened its lead in the high-end word processor race, while WordPerfect and, at the rear of the pack, Nisus Writer trail well behind. But performance can't be ignored where Word 6 is concerned. Some criticisms of Word's speed have been overblown, and Microsoft says it is working on an update to address speed problems caused by system-extension conflicts and large numbers of fonts. (For more on Word 6, see *Reviews*, *Macworld*, February 1995.)

But the fact remains: both 680X0 and Power Mac versions of Word 6 are slower than Word 5.1 (see "Word Processors: Which Is Fastest?"). On older, 68040- and 68030-based Macs, Word 6 is even slower. The bottom line is that if you have a fast 68040 machine or a Power Mac, Word 6 is the best all-around choice; for the millions of slower Macs in use today, Word 6 is slow—too slow for all but the supremely patient. For these machines, hang onto Word 5.1 if you already own it, and if you don't, try WordPerfect or, if it has a feature you especially need, Nisus Writer. If you own a slower Mac and desperately need something that only Word 6 offers, your only alternative is to bite the bullet and buy a new Mac that can run Word 6 at an acceptable speed. m

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ROBERT C. ECKHARDT is a *Macworld* contributing editor. He has written books on Word and on the first version of FullWrite, and is now writing a book on Maya archaeology.

HIGH-END WORD PROCESSOR

Flexibility and power for creating long, complex documents, the ease with which documents can be created, and the speed and responsiveness of the program are what determine which high-end word processor is best.

For Fast 68040 Macs and Power Macs

Microsoft Word 6 More often than not, Word 6 performs complex tasks better and more easily than any other word processor. **Company:** Microsoft Corporation. **Street price:** $325.

For Slow 68040 Macs and Slower

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EMPLOYEE EVALUATION

NAME: Chris Wolfe **DATE PREPARED:** 9-8-94

TITLE: Product Manager

DEPARTMENT: Account Management

OVERALL PERFORMANCE:

☒ **Outstanding** ☐ **Commendable** ☐ **Satisfactory** ☐ **Needs Improvement**

COMMENTS:

Chris has become an indispensable member of the account team. He has demonstrated a high level of motivation and enthusiasm for the job. Perhaps the most compelling evidence of this can be found in his ability to work independently, where he picks up new tasks easily with little need for supervision or instruction. He consistently recognizes and works around obstacles to maintain productivity. Consequently, he often completes assignments ahead of schedule. At a time when collaboration is more critical than ever, Chris has also proven to be an excellent team player. He works effectively with coworkers on projects where teamwork is essential, and can easily motivate and inspire others to achieve. When delegating tasks, his thoughts are well organized and his ideas clearly articulated – an indication of his excellent communication skills. His projects are all distinguished by an attention to detail. His conclusions are always sound and logical. And he excels in time management, effectively compiling and analyzing information. He always manages to work efficiently, setting an example for effort throughout the company. Promotion and appropriate compensation are recommended at this time.

Chris Wolfe — **Employee's Signature**

J Bloom — **Evaluator's Signature**

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Keep track of how to communicate with people. This single mailbox automatically combines and sorts all your incoming and outgoing mail – including on-line services, e-mail, voice mail, faxes and other messages.

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You know those tasks you repeat over and over? With AppleScript, you can automate a series of actions you perform frequently and repeat them with a single keystroke. Leaving more room for work – and less room for error.

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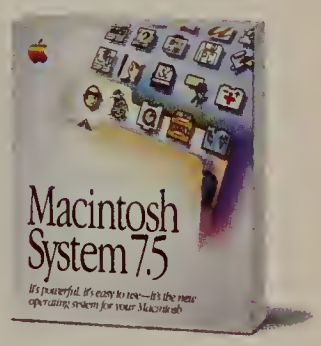

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MACWORLD LAB LOOKS AT FOUR CONTENDERS THAT DON'T GOBBLE UP MEMORY AND HARD DISK SPACE

Lean Writers

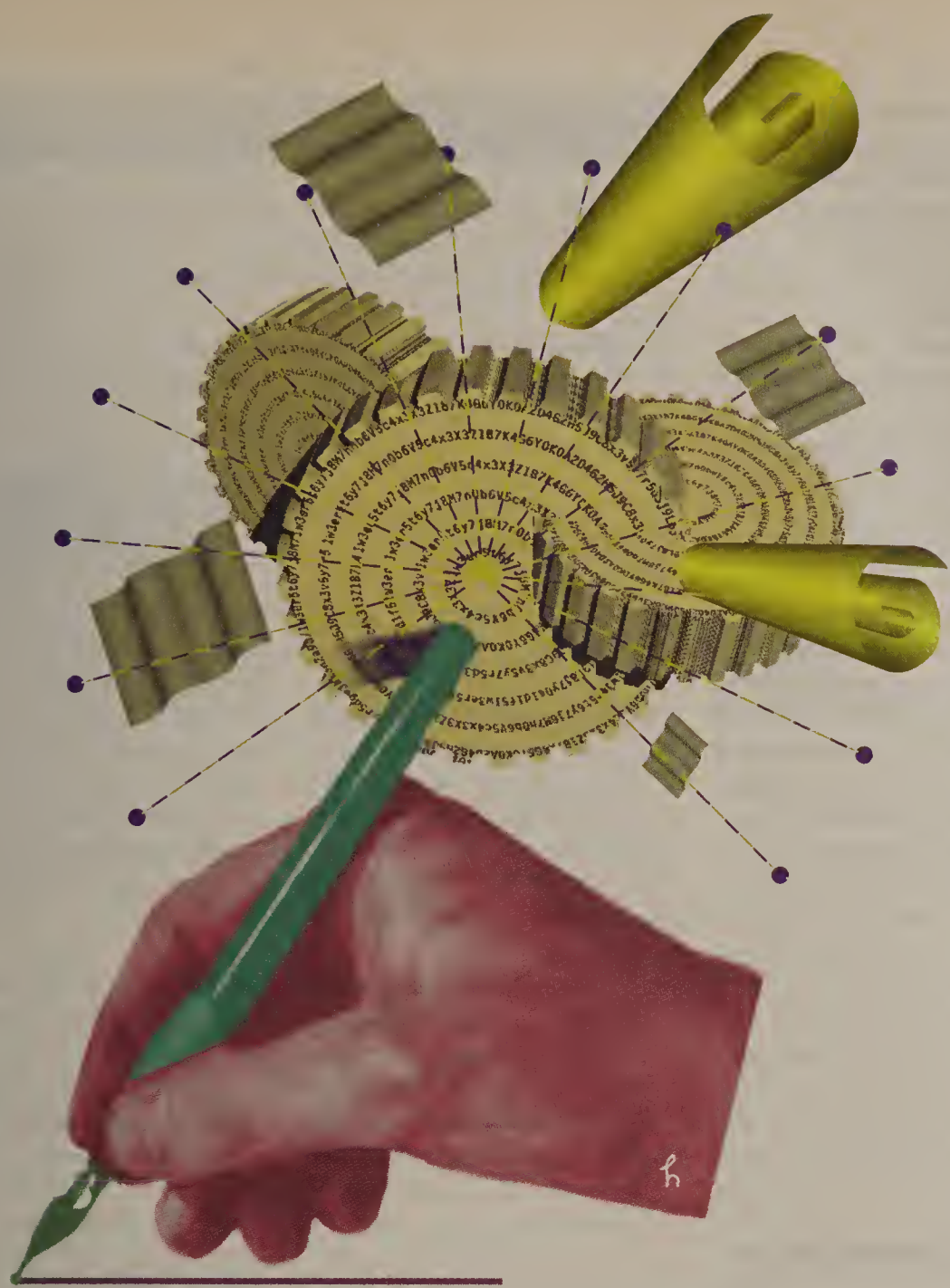
MW LAB

BY DAVID POGUE

In 1984, MacWrite fit on one 400K floppy disk—with room left over for a System Folder and a chapter or two. Today, Microsoft Word would fill 65 of those disks. Word processors have become lumbering behemoths, so bogged down with page-layout, math, and graphics features that they're barely even appropriate for word processing anymore.

Fortunately, in this age of the unparkable Mack truck, you can still buy a Honda Civic—and get a faster, smoother, and less expensive ride. For example, in the time it takes Word 6 to open on a Power Macintosh, you could launch the nimble WriteNow four times (see the benchmarks "Word Processors: Which Is Fastest?" in the feature "Word Processing Powerhouses," immediately preceding this article).

Today's word processors with midrange capabilities are inexpensive: LetterPerfect 2.1 lists for a mere $49.95, MacWrite Pro 1.5 goes for only $99, Nisus Compact 3.31 lists for $150, and WriteNow 4.0 for $119.95. They require only a fraction of the memory and disk space that their full-fledged competitors demand. And these days, using a low-cost word processor no longer means conducting your literary affairs in a pumped-up TeachText. True, these programs don't compile indexes or kern headlines. But all four offer the basic word-crunching tools: they include spelling checkers, mail merge your form letters, mix graphics and text on the same page, create multiple headers and footers, and look up words in a thesaurus. They all let you create multiple columns on a page and search for and replace words and formats. And all



four offer sweet little usability touches that the jumbo word processors lack, such as making the cursor appear fatter on a PowerBook screen or displaying the font menu with the actual typefaces.

In days of old, using one of these alternative word processors meant stranding yourself on an island of incompatibility, but no longer. All four can directly open files in Microsoft Word version 3, 4, and 5 formats. Using XTND conversion technology, all can save files in Word format directly (except WriteNow, which can save in Word-readable RTF format). In other words, you can switch to one of these sprightly word processors and your colleagues won't know the difference.

So what's the catch? There are two: First, if you do need indexing, revision-tracking, or some other highly specialized feature, you probably won't find it here—take a deep breath and proceed directly to a high-end word processor. Second, if you're a compulsive software upgrader, note that three of the four packages compared in this article share one more thing in common: they are being abandoned by their publishers and are slated for extinction.

Nisus Compact

There's no slogan "Nisus Compact: the quirky word processor," but there should be. Nisus Compact is a lovably oddball, slim-line edition of Nisus Writer, the most lovably oddball program on the market. Nisus Software's programmers seem to have reinvented every aspect of a word processor, substantially improving upon many standard word-processor features—and at the same time substantially diminishing others.

Most of the improvements are in usability. Nisus Compact brims with "that's just what I was looking for" features that few other programs offer. You can undo your last 300 steps. You can select noncontiguous chunks of text at the same time, a useful Nisus exclusive. You can split the screen horizontally, vertically, or both ways. Electronic bookmarks let you jump to marked spots in a document. A nice touch: you can rename the open document without doing a Save As. Even nicer: you can edit what's in the Clipboard before pasting it.

Nisus Compact is also the word processor most tuned for PowerBook use. A single press of the enter key locates and highlights the cursor. You can keep the whole program in memory, greatly diminishing hard disk access to save battery power; and Nisus Compact provides information on battery, RAM, and usage.

As with Nisus Writer, documents created by Nisus Compact appear to other programs as plain TeachText documents, so just about any Macintosh program can import them. Yet when you open any Nisus document with either Nisus version, all formatting and style information is still there.

Unfortunately, in their zest for the unconventional, the designers left out some important conventional features. For example, there's no print preview, which renders the multiple-column capability pretty unmanageable. In a similar vein, the program shows a gap, a gray stripe, between pages—fine, except that it *doesn't* show the margins, so text appears to run right up to the edge of each page. You can't create small caps, and you can't color text. The scantily indexed manual is almost amateurish. And worst of all, Nisus Compact has no table editor, a staple of modern word processors.

Nisus Software says that most copies of Nisus Compact are bundled with hard drives rather than sold and that the program won't be upgraded; it's the first of our three word processor orphans-to-be. Nisus Compact is potent for PowerBook owners, and fascinating for students of word processor design. But it may leave you hungry for something less compact.

LetterPerfect

This scaled-back version of WordPerfect is a clean, by-the-book Macintosh program, well groomed for office work, with online help, balloon help, publish and subscribe, print preview with magnification or reduction, spelling checker, thesaurus, and even a grammar checker. There are two glaring omissions: paragraph style sheets, which you might not miss, and tables, which you will. On the other hand, the features that LetterPerfect does provide offer an almost amusing number of options: there are 8 commands for footnotes and endnotes, for

example, and 28 just for formatting dates and times.

In light of LetterPerfect's corporate conservative, solid feel, it's surprising to find that it, like Nisus Compact, offers a handful of unusual features. For example, it can password-protect confidential documents. It can automatically renumber outlines as you add, move, or delete headings. And, as in Word, a handy menu lists the most recent documents you've worked on—and another menu lists some very useful ready-made stationery templates for a business letter, an envelope, a memo, and so on.

Guided by its remarkably articulate manual, you can grasp the program's layout and soul within half an hour. At $49.95, LetterPerfect is a surprising bargain.

Unfortunately, despite LetterPerfect's value and polished office-readiness, this program, too, has been abandoned. It's still for sale, but it hasn't been updated in more than two years, and WordPerfect doesn't plan to devote further attention to it. Like Annie, LetterPerfect is a good-looking orphan.

WriteNow

In its fourth incarnation, WriteNow still reigns as the fastest word processor you can buy. In our speed tests, WriteNow blew away all other programs, low-end and high, winning half the tests in a field of 13 test scenarios. (Nisus Compact was a close second in some tests and edged out WriteNow in a couple.) WriteNow is ready for typing only 5 seconds after you double-click on its icon. A font change that took LetterPerfect 15 seconds took WriteNow only 3. Microsoft Word version 6 on a Power Macintosh took 30 seconds to count words—WriteNow took only 3.

WriteNow is equally impressive in its tininess, outcompacting even Nisus Compact. The application alone requires only 350K of disk space and asks for only 400K of memory. That's a blessing for PowerBook users; even on a 4MB laptop, you can stuff WriteNow and a System Folder onto a RAM disk, put the hard drive to sleep, and coast for five hours on a battery charge.

WriteNow is a pure writing machine, designed for speed and efficiency. It offers

A FEW UNIQUE FEATURES

All word processors have many basic functions in common, but what really sets this batch apart from each other are a few features unique to each.

Nisus Compact
- Multiple undo
- Editable Clipboard
- User-definable key commands
- Noncontiguous selection
- Electronic bookmarks

WriteNow
- Seven underline styles
- Copy and paste formats
- Insert horizontal line
- Control of scrolling speed
- Import styles from other documents

LetterPerfect
- Outlining
- Vertical centering on page
- Password-protection of files
- Vertical-rule tab style
- Templates accessible from menu

MacWrite Pro
- Electronic sticky notes
- Floating font and style palettes
- PowerTalk E-mail support
- Automatic table-of-contents builder
- QuickTime movie playback

Lean Word Processing Alternatives

	LetterPerfect 2.1	MacWrite Pro 1.5	Nisus Compact 3.31	WriteNow 4.0
Company	WordPerfect Corporation	Claris Corporation	Nisus Software	Softkey International
Phone	801/225-5000	408/727-8227	619/481-1477	617/494-1200
Toll-free phone	800/451-5151	800/325-2747	800/922-2993	800/227-5609
List price	$49.95	$99	$150	$119.95
Application size/full install	665K/2M8	690K/1.6MB	350K/1.3MB	350K/2.3M8
Minimum RAM/preferred RAM	700K/800K	650K/1M8	512K/900K	400K/595K
Ease-of-use Features				
Online help/balloon help	●/●	●/●	○/●	●/●
PowerBook cursor	○	○	●	●
WYSIWYG font menu	○	●	●	●
Print preview	●	●	○	●
Zoom in/zoom out	●/●	●/●	○/○	○/●
Window tiling	○	●	●	●
Automatic save	●	●	●	○
Formatting				
Style sheets (character/paragraph)	○/○	●/●	●/●	●/●
Color text	●	●	○	●
Small caps	●	●	○	○
Paste, size, crop graphics	●	●	●	●
Power Tools				
Tables	○	●	○	●
Spelling checker and thesaurus	●	●	●	●
Word count	● *	●	○	●
Footnotes	●	●	●	●
Mail merge	●	●	●	●
Hyphenation	○	●	●	○

* *Entire document only.*

an easy-to-use style-sheet feature with both paragraph- and character-based styles, tables, footnotes, spelling, thesaurus, print preview, and balloon help. Tables are easy to work with, thanks to the floating tool palette that lets you, for example, apply shading to a row with a single click. The only features you might miss are autosave, small caps, and auto-hyphenation.

Unfortunately, WriteNow's idiosyncrasies are enough to keep it from being a natural for novices. Weirdly, for example, the page scrolls upward when your typing reaches the *middle* of the window instead of the bottom. And WriteNow's formatting ruler is a separate windowette, which you must bring forward with a click whenever you want to change a paragraph. To make matters worse for the technically impaired, WriteNow's manual isn't nearly the model of perfection exemplified by, say, MacWrite's.

Otherwise, at $119.95 list, WriteNow offers much greater value—and certainly greater speed—than any of the high-end behemoths. But believe it or not, this program, too, is virtually washed up. Softkey, which acquired WriteNow essentially by accident after a series of mergers and buyouts, doesn't plan to upgrade the product. Popularity isn't the issue this time, it's technical: WriteNow's speed derives from having been written specifically for the 680X0 series of processors, so for Softkey to upgrade WriteNow for the Power Mac would require starting from scratch.

MacWrite Pro

You won't fit this baby on a 400K floppy disk. Today's MacWrite is generations bulkier than its distant ancestor. But it's also light-years more capable, boasting nearly as many features as the behemoth word processors. Yet at $99 list, MacWrite fits in fine with the lower-cost programs reviewed here. Still, MacWrite's clean interface makes it a rebel against the forces of rampant featuritis.

MacWrite, more than any other program in this article, ventures into the junior leagues of real desktop publishing. For example, the Frame feature lets you draw a box anywhere on a page and then fill it with a graphic, a QuickTime movie, or sidebar text. Without wading through any dialog-box muck, you're performing feats of page layout that would overwhelm the other programs reviewed here.

MacWrite's floating palettes should be the envy of the more expensive programs. With one click, you can apply a new font, size, or style to selected text—or, if you've opened the Styles palette, you can zap a paragraph into shape by applying a style sheet to it in the same way. The table-of-contents command is also smooth and simple: assign the TOC styles 1 through 4 to the headings in your document, and a neatly page-numbered contents page is one menu-choice away. There's also a Section formatting command, so each part of your document can have its own page numbering, footnote, and column styles. And yes, MacWrite even kerns headlines.

In short, MacWrite is as pretty and polished as a word processor can get, especially suited to creating graphically interesting documents. Just about everything is where you expect it to be, and if not, you can turn to Claris's typically perfectionist manual. MacWrite doesn't offer any real advantages in speed, size, and memory requirements, though its RAM and disk-space needs are impressively small; but it comes with this to recommend it: a future—there is no sign that Claris will give up on MacWrite.

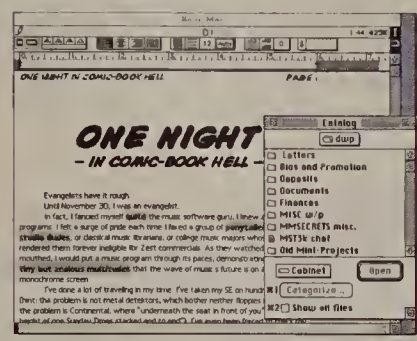
The Last Word

The marketplace has spoken: the sad fact is, low-end word processors just don't sell like they should. Even world-champ marketing giant Microsoft tested these waters a few years ago with Microsoft Write—and drowned. Apparently, too many people succumb to LAGS (latest-and-greatest syndrome) and buy the hulking "pro" programs instead. And, of course, vendors prefer to sell more-expensive and more-profitable high-end products. Just as Microsoft Write competed in its day with Microsoft Word, LetterPerfect and Nisus Compact compete with other products from their respective vendors, drawing away not only the other guy's customers, but selling their own customers a less profitable product. It's too bad, really; the low-end programs are light, clean, fast, and more powerful than ever.

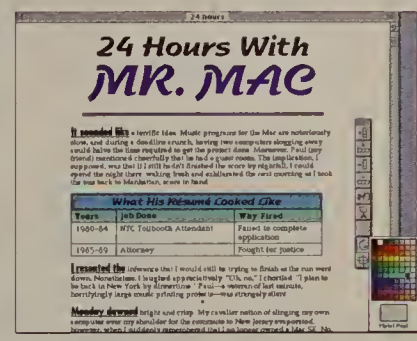
If you're tired of out-typing your Mac, your choices are disappointingly few. You can get a well-designed, brisk word processor in the sunset of its days. Or you can buy one of those enormous high-end packages—and factor in the cost of a speedy new Mac. **m**

Tweaking MacWrite MacWrite lets you draw boxes for headlines and graphics and quickly assign colors and borders to them. The Text palette gives you access to fonts, formats, and even kerning.

LetterPerfect Direct LetterPerfect is nothing if not streamlined. Even with so many options available, as in this Find and Replace box, they're neatly tucked away in a miniature menu bar right in the dialog box.



Unusual Nisus At right, Nisus's Catalog window gives you full-time, easy-click access to documents. The text window shows several separate patches of selected text, which can be reformatted all at once.



WriteNow's Styles The first few words of each paragraph have been formatted with a character-based style. Shading elements in a WriteNow table is as simple as choosing from the floating table palette.

Contributing editor DAVID POGUE is the author of the top-selling Mac book, *Macs for Dummies*, third edition (IDG Books Worldwide, 1994). His PowerBook is even lighter now that its hard drive carries WriteNow instead of Word.

LOW-COST WORD PROCESSOR

MW EDITORS' CHOICE

The point of these straightforward word processors is speed, savings, and just the right features. If you can get pro-league features, cleanly implemented, for under $100, you've got yourself a winner.

MacWrite Pro It's full-featured, memory-sparing, and it's $99. Its style sheets, tables, word count, WYSIWYG font menu, footnotes, and table-of-contents features are a snap to figure out, even without the outstanding manual.
Company: Claris Corporation.
List price: $99.

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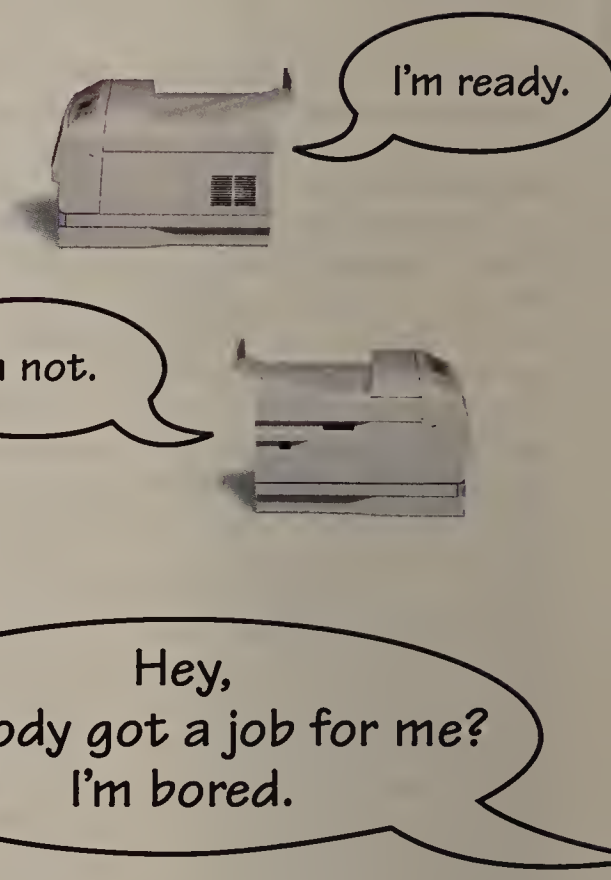
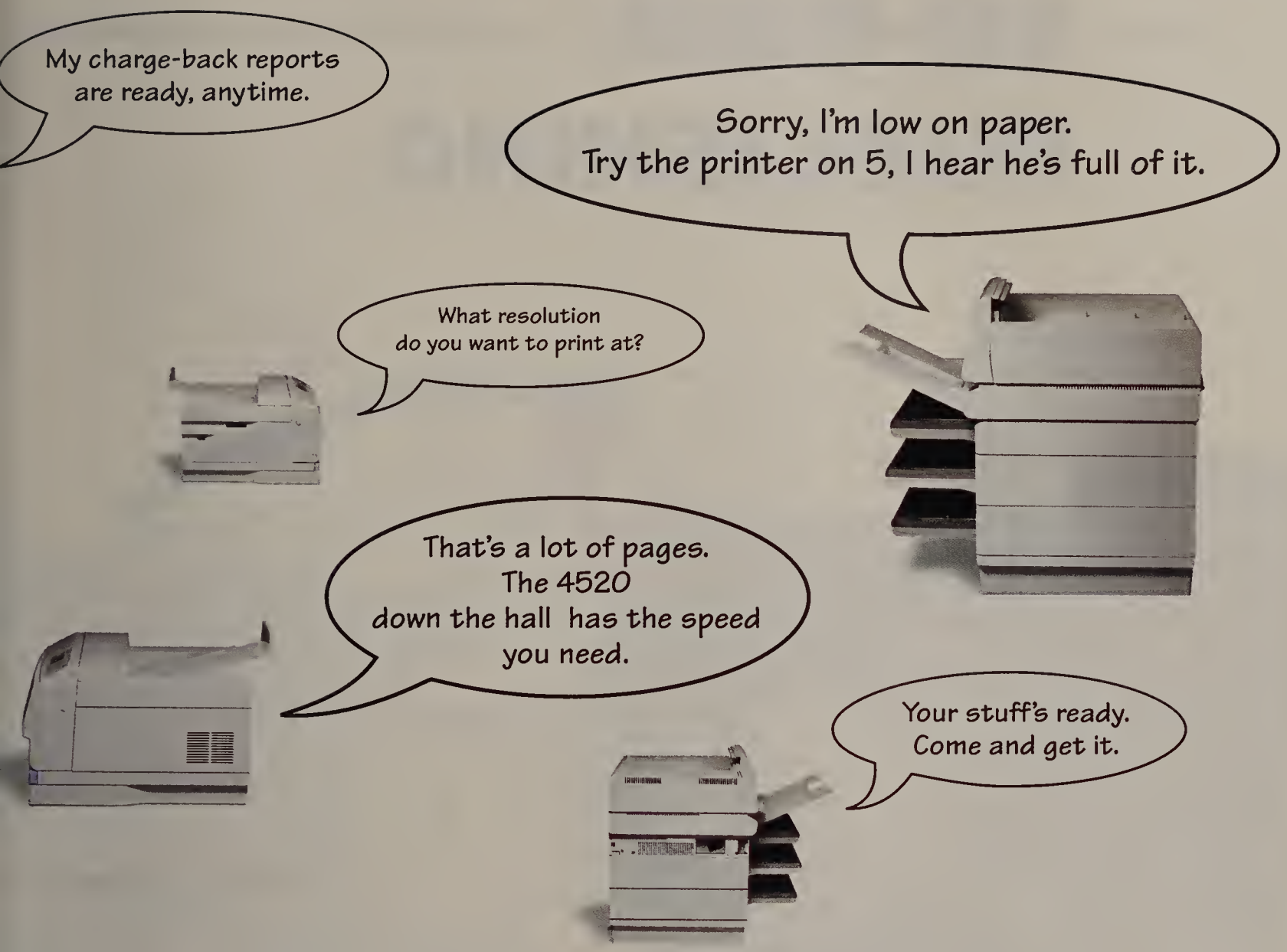
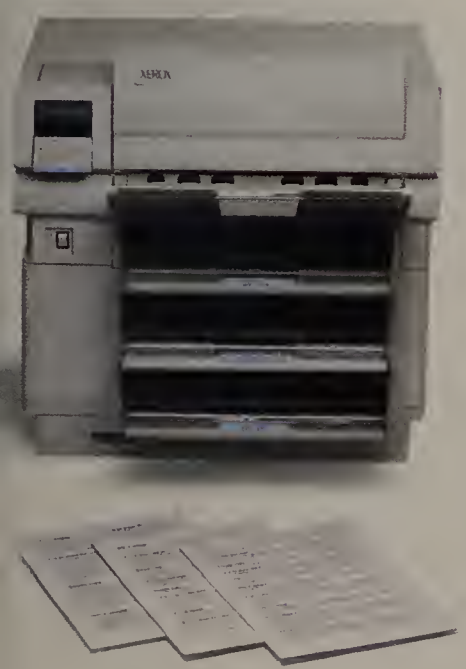


THE DOCUMENT COMPANY

XEROX





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DESKTOP CD-ROM PUBLISHING

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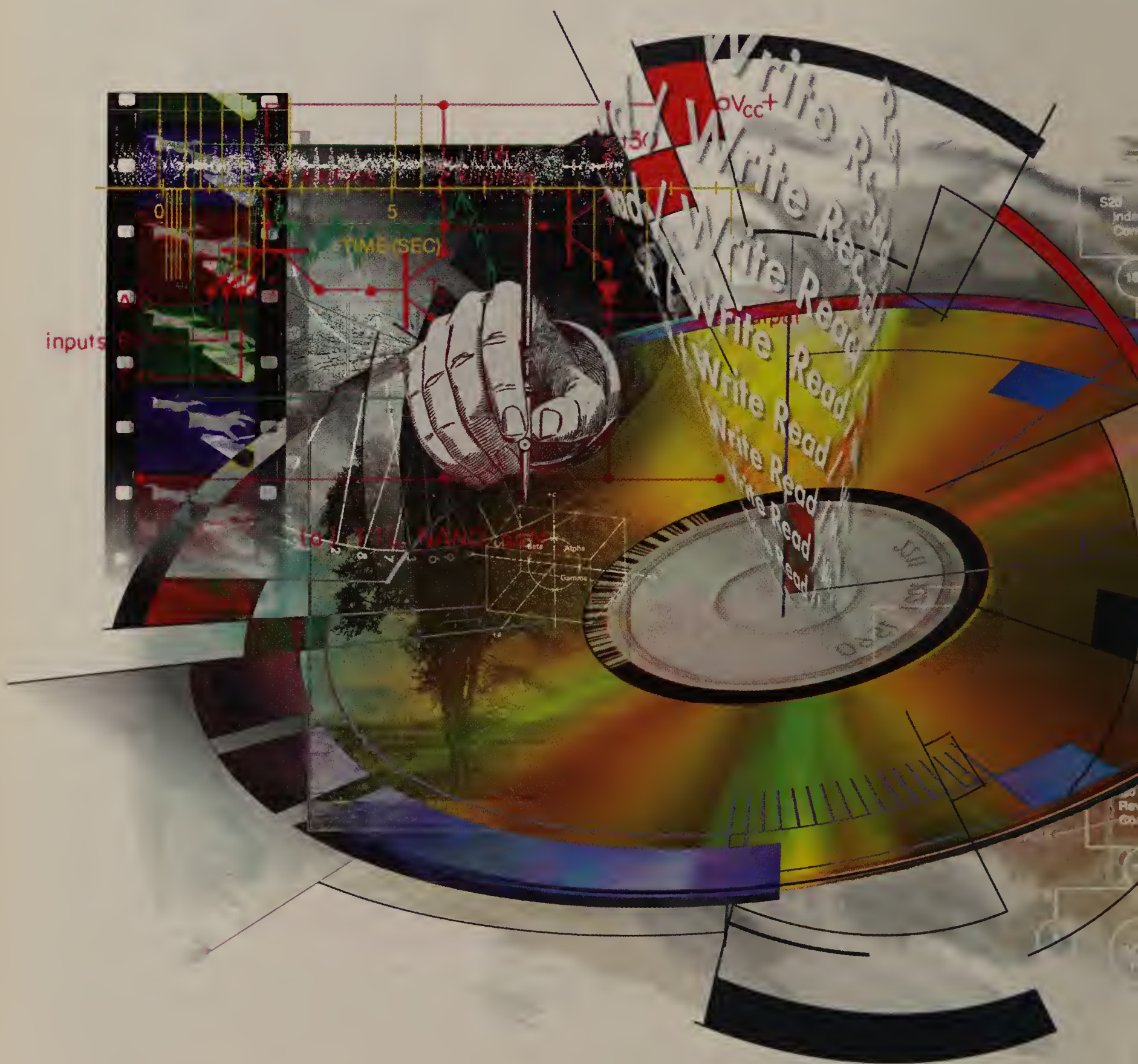
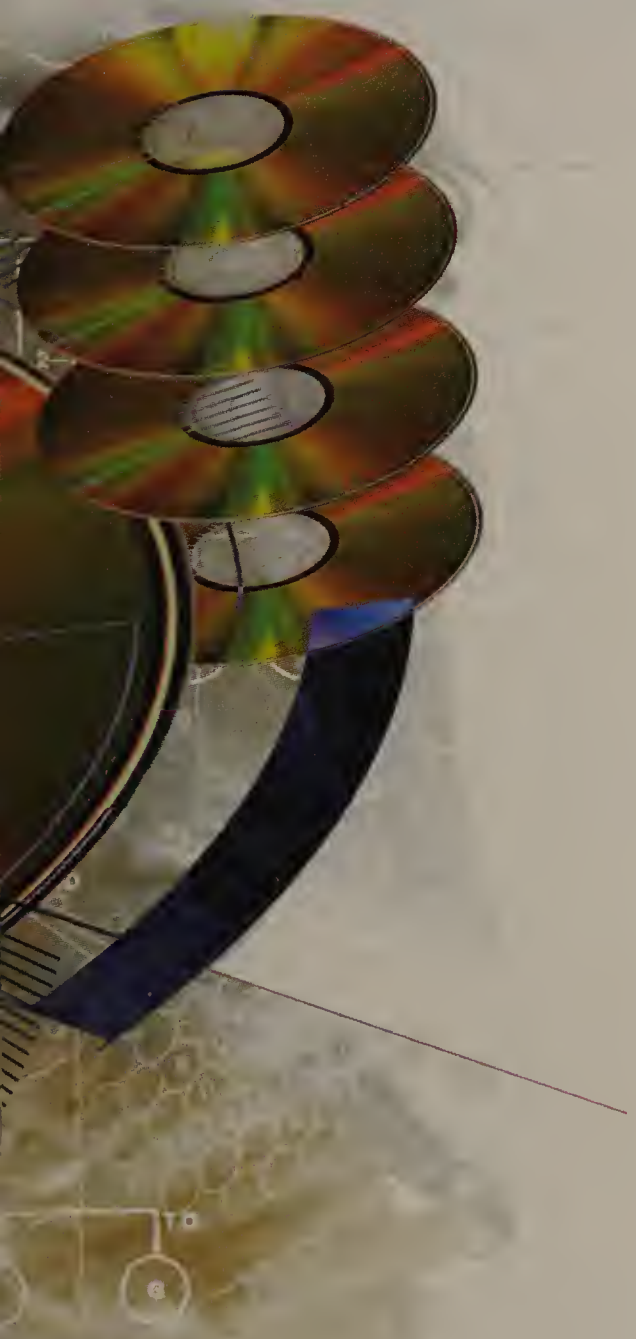


or creating multimedia titles, recordable CD technology has arrived

Whether you want to archive important data, distribute limited numbers of custom CD-ROMs, or create a single beta copy of a multimedia title, desktop CD-R (Compact Disc–Recordable) technology offers a tantalizing solution. Simply pop a gold-coated blank CD into the CD-R drive and voilà, a CD (almost) instantly emerges.



JEFF BRICE

Predictably, although desktop CD-R products have progressed admirably in the past year—to the point where they can now be considered by a wide range of users, not just pioneers—the process is hardly that simple or speedy. Macworld Lab tests reveal that CD-R has not yet completed the transition from a complex technology designed for use by full-time CD service bureaus to a ready desktop tool. None of the programs we tested offered all of the features, performance, and ease of use that we had hoped for; and upgrades promised last spring were still unavailable at press time. A CD-R drive is not yet the laser printer of the 1990s, and the state of CD-R publishing in general is roughly akin to the bumpy, earliest days of desktop publishing.

Consequently, CD publishers creating hundreds of CDs will probably still want to send their files to a professional mastering house, where prices range from $1500 to $5000 for mastering and a few dollars per CD for pressing. People who want to create dozens of CDs, however, might want to brave the CD-R waters. When Sony and Yamaha first introduced desktop CD-R systems in 1989, price tags of $30,000 were common, but costs have now dropped to the $4000 range, and people willing to invest a bit of time tweaking files and tuning their systems may find CD-R to be just the ticket.

Just as with choosing a new computer system, the trick to entering the CD-R realm lies first in identifying the software that best suits your needs and then in matching that software to compatible hardware. But no matter what you get, keep in mind that you'll need a fast Mac—like a Quadra 650 or Power Mac 7100—to process the CD-R data quickly enough.

Easy Archiving

Archiving vast stores of data onto a CD is perhaps the simplest CD-R task. It's also the most common, according to a recent survey of CD-R users done by the trade weekly *InfoWorld*. A blank CD that can hold 550MB to 650MB of data now costs as little as $15; the medium has a long shelf life; it is immune to the destructive forces of magnetism; you can access its information randomly; and it takes up very little space. In addition, you don't have to wait for a commercial CD-mastering facility to produce the CDs. With CD-ROM drives being so inexpensive, you can more easily count on people being able to use the CDs.

We found that going the CD-R route to archive data was as simple or as complicated as the software we were using. We looked at seven programs, as described in the table "CD-R

BY JIM FEELEY & SUZANNE STEFANAC

Software Compared." Our test files consisted of 647MB of data made up of 7608 text, graphic, and binary files (some CDs contain tens of thousands of files).

Pouring this data onto a CD was as easy as drag and drop for Optical Media International's QuickToPix II 1.02. Equally simple was the file-selection scenario in OptImage's CD-It All. (The same software is available under the name Toast when purchased with the Plasmon Data Systems RF4100 drive.) Dataware Technologies' CD-Record was more complicated, requiring us to enter text defining the files and their location on the CD; the clt-Maker utility that hastens this suboptimal file selection has remained in beta testing for more than a year.

Some CD archivists need to write their material to the CD in more than one sitting. To do this, both the hardware and software must support multisession capabilities. QuickToPix doesn't support multisession and neither does the Sony CDW-900E drive. (For a look at CD-R drives, see the sidebar, "The CD-R Drive Decision.")

Although multisession recording is a good thing, the current technology does have some major kinks that developers need to work out. Each time you write a session to a CD, you waste 14MB of the CD's space because of how the individual sessions' data is placed. Also most CD-R software writes each session as a separate volume, so users see a separate icon on the Mac desktop for each session. That increases the complexity of finding the data you need. Only CD-It All and Toast let you create a multisession CD with just one volume (and thus one desktop icon).

While appealing for their low per-copy cost, CDs aren't always the best archiving medium. They cannot be erased and reused, for instance. And the overall cost of the CD-R system may prove a deterrent to anyone already committed to other archiving methods, such as magneto-optical disks (see "Optical Expansion," *Macworld*, December 1994), tape, or SyQuest or Bernoulli cartridges.

PAUL FRANZ-MOORE

Best Recordable CD Drives If you enter the brave new world of CD-R, we recommend you look at the Yamaha CDE100 (top), the only quadruple-speed drive. Other good choices are the double-speed Plasmon RF4100 (lower left) and the single-speed JVC BC-CR200 (lower right) drives. All three drives work with our recommended CD-R software: Optimage's CD-It All (sold by Plasmon as Toast). The JVC drive, which was recently replaced with a double-speed version, is available with a hard drive (as shown here) when purchased with JVC's Personal RomMaker software.

Multimedia Test CDs

A major use of CD-R technology is to create test copies (called *one-off* copies) of multimedia CDs that you are authoring—particularly those that contain linked files such as QuickTime movies and audio. Rather than go to the time and expense of sending your hard drive to a CD service bureau to create a test CD, you can do it at your workplace faster and cheaper.

Why test a CD? Just because an audio or video clip runs well from your hard disk is no guarantee that it will perform well from a CD-ROM drive. All of the software tested—except JVC Information Products Company of America's lower-end Personal Archiver—lets you emulate CD-ROM–drive playback of files, at the lower CD-ROM speeds, from your hard disk.

Playback from a CD differs from playback on an authoring system's hard disk for several reasons. One is that throughput for a CD-ROM drive ranges from 150 to 600 kilobytes per second (KBps), compared with a standard SCSI hard disk's 1.8 to 3.5 megabytes per second (MBps). Another reason is that a CD-ROM drive must maintain constant linear velocity, which makes it spin faster when reading data from the center of a CD and slower when reading from the outside. Third, a CD-ROM drive's heavy read head moves much more slowly than a hard drive's head. And don't forget to add in the effects of software lags when loading and playing back a video or audio clip.

These physical differences in how hard drives and CD-ROM drives record data affect any type of CD. Issues related to mastering—the placement of files on the CD—also affect performance if you are authoring CDs for use on PCs (using the ISO 9660 format) or for use on both PCs and Macs (using the ISO 9660 format for the PC portion and the HFS format for the Mac portion; these are called hybrid CDs). The mastering issues combine with the recording issues to introduce further performance concerns, as described later.

To determine how well the various products worked with multimedia files, Macworld Lab wrote 302MB of data—with QuickTime video, animations, and sound—to CDs. Again, the process was fairly straightforward. Because we were transferring all of the data in one sitting, we didn't need to consider multisession capabilities, for instance.

But because we were creating a multimedia CD, we did need to think about file placement. Anything that will be accessed regularly, such as an index of contents or a search engine, should reside on the innermost area of the CD, because that's where the CD-ROM drive can most quickly access information. One common solution is to copy files to a pristine hard disk in the order you would like them written to the CD. Another is to use the

file-placement capabilities built into some of the software.

JVC's Personal RomMaker software gives you a great deal of control over the placement of individual Mac HFS and PC ISO 9660 files on the CD. Dataware's CDRecord, Incatsystems Software USA's Easy-CD Pro, OptImage's CD-It All, and Plasmon's Toast all provide some placement capabilities, but only for ISO 9660 files. (For ISO 9660, files are normally added in alphabetical order when you copy an entire volume to CD; in HFS, the normal copy order is the order in which they are stored on the Mac.)

Why is placement an issue? Many CD-R programs copy the entire disk image—an exact copy of the files and their placement—when creating a CD. That can result both in less-than-optimal file order on the CD and in wasted time due to copying empty sectors from the source hard disk. The better programs—CD-It All 2.5 and Toast—give you an option to control the contents of the disk image, as well as control the file placement. Both programs can create a file on your hard drive that acts as a temporary partition, circumventing the requirement to place all HFS data onto a separate hard drive partition. This eliminates wasted writes. However, it's not perfect: with the partitioning feature engaged, CD-It All and Toast did not copy hidden files on the source hard disk (using such hidden files is a common practice in commercial multimedia titles). The two programs did copy such files when we copied the entire disk image to CD.

Another multimedia feature that is becoming more popular is the ability to write Red Book audio (44.1kHz 16-bit audio files that can be played on any audio player). Easy-CD Pro, Personal RomMaker, Personal Archiver, CD-It All, Toast, and Sony Electronics' Hybrid Formatter do this fairly smoothly. Easy-CD Pro 1.4 writes only one audio track at a time to a CD-R.

Limited CD Distribution

Perhaps the best use of CD-R is the periodic dissemination of information—such as text, databases, and graphics—to a lim-

THE CD-R DRIVE DECISION

Although there are an increasing number of drives on the CD-R hardware scene, there are more similarities than differences among them. Each CD-R drive head houses a high-power laser that, in effect, burns pits into recordable CDs. A CD-R drive that records at 600 KBps (quadruple-speed) requires a much higher-power laser with a much shorter pulse than a drive that records at 150 KBps (single-speed), for instance.

The recordable CDs used in the CD-R process are unique in that they are coated with a chemical sandwich made up of layers of an organic photosensitive green dye, gold, and lacquer. (The silvery, commercially produced CDs are coated with aluminum and lacquer.) As on most other CDs, information is stored on the CDs in a long, continuous spiral that is about 600 nanometers wide and 3 miles long. The laser in the CD-R head burns pits into the dye layer of the spiral; these pits disperse the light, leaving plateaus (called *lands*) that reflect the light back to a CD-ROM drive's sensors.

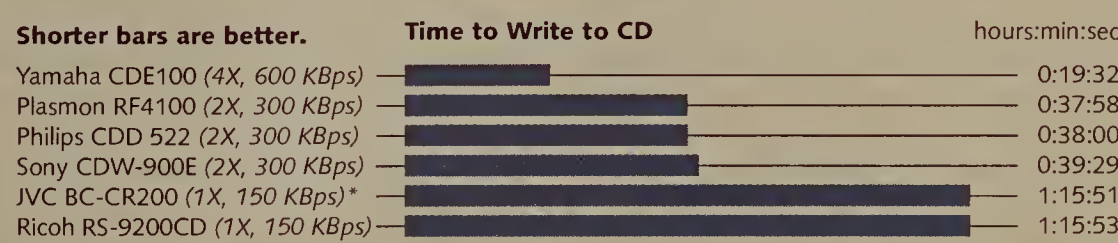
The primary distinguishing characteristics among CD-R drives are their rotational speeds, cache sizes, and prices. Macworld Lab tests showed that a double-speed CD-R drive records at twice the speed of a single-speed drive, and a quadruple-speed CD-R drive, not so surprisingly, records twice as fast as the double-speed drive.

Cache sizes vary from Sony's 4MB to Yamaha's 512K. Although faster hard drives and better thermal-recalibration schemes have rendered cache size less important than it was a few years ago, larger caches mean fewer buffer underruns and more-secure writes.

A few other differences emerge among drives. Anyone who requires multisession capabilities should keep in mind that the otherwise fine Sony CDW-900E drive is not multisession capable. All CD-R drives tested can be used as slave drives (where you can write the same data to two or more CD-R drives at the same time); for the JVC drive, this is a $1700 option. All CD-R drives except the Sony CDE-900E can double as regular CD-ROM drives to read CDs. And with both the JVC and Sony drives, people creating CDs in volume can daisy-chain several drives and write more than one CD at a time.

What Faster CD-R Drives Really Offer

Although writing a CD is only one small part of creating one, people who need to distribute copies of a CD will find the faster drives attractive. To compare relative performance, Macworld Lab used Plasmon's Toast version 2.5—which works with all of the mechanisms we received—to create ISO 9660 discs containing 647MB of data for 7608 files and folders. As expected, the 4X Yamaha drive took one-fourth as long to write an entire 74-minute CD, and the 2X drives took one-half as long as older, single-speed drives.



**JVC replaced this drive with a double-speed unit as we went to press.*

BEHIND OUR TESTS

We used a 1.6GB Micropolis AV drive from APS Technologies as our source volume and a Centris 650, which provided us with the transfer rates we needed to avoid buffer-underrun errors—cases where a low data rate fails to provide a steady flow of data to the recorder.
—Macworld Lab testing supervised by Tim Warner

CD-R Drives Compared

Company	Product	List Price	Cache Size	Phone	Toll-Free Phone
JVC Information Products	XR-W2001	$2695 [A]	1MB	714/261-1292	none
Philips LMS	CDD 522	$3899	2MB [B]	719/593-7900	800/777-5674
Plasmon Data Systems	RF4100	$2995 [C]	1MB [B]	408/956-9400	800/445-9400
Ricoh Corporation	RS-9200CD	$3000	1MB	408/432-8000	800/955-3453
Sony Electronics	CDW-900E	$5699	4MB	408/432-0190	800/352-7669
Yamaha Systems Technology	CDE100	$5500 [D]	512K	408/467-2300	800/543-7457

[A] $6595 bundled with Personal RomMaker and 1GB hard drive. [B] Upgradable to 8MB or 32MB. [C] $3850 with Toast software. [D] Internal version costs $5000.

ited audience. The resulting CDs are cheap to mail, are easy to update (through multisession writes), and recipients can play them on a variety of platforms if you've prepared your data carefully.

All the programs we evaluated create both HFS-only and ISO 9660–only CDs. Easy-CD Pro, RomMaker, CD-It All, Toast, and Hybrid Formatter allow the creation of hybrid CDs. (QuickToPix offers a $395 hybrid option.) For CDs that will be read on PCs, look for CD-R software that facilitates conversion from the Mac's HFS file structure to the ISO 9660 structure. While all the programs will automatically rename files with ISO-compatible names, Dataware's text-intensive approach was awkward, and Easy CD-Pro required us to tediously confirm the conversion of each file name.

As you spend more time preparing complex data for CD-R, be sure your software doesn't unnecessarily lengthen the process. Although most of the software required only minutes to process the 7608 files in our test suite before writing a CD, Macworld Lab found that Easy CD-Pro took 2.5 hours for the same task.

Software that warns you if data is improperly prepared—with fragmented files and improper names, for instance—before creating a CD, and that verifies the finished CD, helps minimize the number of calls you'll get from users who can't access the data. Hybrid Formatter tests data before writing to CD, for instance, sending informative warnings that identify errors when it encounters problem files or structures. QuickToPix warns if your ISO 9660 data is improperly named or formatted. CD-It All and Toast provide handy automatic CD verification after a write, but we wished they had offered more thorough testing of the data before we actually wrote to CD; without this capability, we ruined several CDs. (CDs are not rewritable.)

Although manually renaming HFS files so that they conform to ISO 9660 conventions is usually the preferred scenario, if you have thousands of files you might appreciate the automatic ISO 9660–naming options in the two JVC products and Sony's Hybrid Formatter.

Speed is also a factor if you're churning out CDs for distribution. As Macworld Lab tests prove, drive speed is definitely an advantage here. Yamaha's quadruple-speed drive clearly outperformed its competitors in the sheer speed category (see the benchmarks "What Faster CD-R Drives Really Offer"). You might also consider buying several drives and chaining them together to write more than one CD at a time. Sony and JVC have had this capability for some time; all the other vendors claim that their products now do the same thing, although we could not test them in time for this comparison.

CD-R Software Compared

Company	Product	List Price	Supported Formats	Drives Supported [A]	Copy Folders and Files
Dataware Technologies	CDRecord 2.0.1b3	$1995	HFS, ISO 9660	K, Ph, R, S	ISO 9660 only (with text file)
Incatsystems Software USA	Easy-CD Pro 1.4	$1495	HFS, ISO 9660, hybrid, audio [B]	J, K, Ph, Pl, R, S, Y	ISO 9660 only
JVC Information Products	Personal RomMaker 2.20B	$6595 [C]	HFS, ISO 9660, hybrid, audio	J	HFS and ISO 9660
	Personal Archiver 2.00B	$2695 [D]	HFS, ISO 9660, audio	J	no
Optical Media International	QuickToPix 1.02	$1295	HFS, ISO 9660, hybrid [E]	J, K, Ph, R, S, Y	no
OptImage	CD-It All 2.5 [F]	$1995	HFS, ISO 9660, hybrid, audio	J, K, Ph, Pl, R, S, Y	ISO 9660 only
Sony Electronics	Hybrid Formatter 1.1.2B3.1	$950	HFS, ISO 9660, hybrid, audio	S	no

[A] J = JVC, K = Kodak, Ph = Philips, Pl = Plasmon, R = Ricoh, S = Sony, Y = Yamaha. [B] Records only one track at a time. [C] Includes CD-R drive and 1GB hard drive.

Ensuring CD-R Success

Based on Macworld Lab's experience and the experience of professionals, these tips and tricks will help you avoid creating painfully slow or unreadable CDs—no matter what type of CD you are mastering.

• Use a 1GB AV hard drive as your source drive. As some hard drives warm up, they temporarily halt the transfer of data while they adjust for platter expansion. When writing a CD-R session, this can cause a *buffer underrun* (a pause in the data stream) that crashes the session and ruins the CD. AV drives use better thermal-recalibration schemes to avoid this. Although most CDs hold only 650MB, Macworld Lab recommends using a hard drive with more storage than that for scratch files and working files.

• If you are creating HFS-format CDs, defragment your files. Unlike retrieval from a hard disk with fast seek times, the performance of a CD written in the Mac's HFS format suffers if files are scattered all over the platter. You can defragment the data by copying the files to a freshly formatted hard drive before creating the CD, or you can use a hard drive optimizing program such as Alsoft DiskExpress II ($89.95, 713/353-4090). Fragmentation can also cause buffer underruns.

• When using the ISO 9660 format, optimize file location. In this format, the closer files or applications are to the center of a CD, the faster a CD-ROM drive can access them. To place the most frequently accessed files at the center of the CD and the least frequently accessed files toward the outside edge, you can add the files to your CD-R software's file database or ISO disk image in the order they should appear on the CD. Alternatively, some CD-R software lets you control file location. Keep in mind that the file placement is important only in multimedia titles that demand superior performance.

• Use an extensions manager. If screen savers, E-mail programs, alarm programs, and networks kick into gear while you are recording a CD-R, the Mac may temporarily interrupt the transfer of data to the CD-R drive, which can cause errors on the CD. A program like Casady & Greene's Conflict Catcher II ($79.95, 408/484-9228) or Apple's Extensions Manager (free online and in System 7.5) lets you start up your Mac with selected extensions disabled. (You can't just press the shift key to disable all extensions when starting up, because several CD-R programs require that their extensions be loaded.) Also note that some CD-R programs, such as Hybrid Formatter, recommend that AppleTalk be disabled.

• Use temporary partitions. Some CD-R programs copy an entire source volume, both data and blank space, when recording. Others require specific volume sizes. With hard drive utility software such as FWB's Hard Disk ToolKit ($199.95, 415/474-8055), you can create custom-size partitions on a hard drive without reformatting; these partitions make your 1GB hard drive with 200MB of data look like—and record like—a 210MB hard drive. (CD-It All and Toast can do the soft partitioning themselves.) As with any operation of this sort, Macworld Lab recommends that you back up first.

• Create ISO 9660 names yourself. CDs that will be read on PCs must adhere to ISO 9660 file-naming restrictions that

are more strict than those applied to DOS files. Only uppercase letters *A* to *Z*, numerals 0 to 9, and the underscore (_) may be used. Level 1 ISO and DOS file names can have up to eight characters, a period (.), and a three-character extension: THISFILE.EXT. Additionally, directory and folder names cannot exceed eight characters, and directory depth cannot exceed eight levels. PCs do not see files that exceed these bounds. Some CD-R applications offer automatic name conversion, which can be helpful if you need to convert hundreds of long Mac file names to ISO 9660, but the converted names aren't always clear. For example, Mac folders named Thursday's Tests and Thursday's Results may become ISO 9660 directories THURSDAY and THURSDA1. You'll keep better track of your file names if you convert them to ISO 9660 yourself.

- Build an image file. An image file is a mirror of the files you want to transfer to the CD. Image files let you check for missing files and improper or unclear ISO 9660 names. Drawbacks include the fact that an image file doubles the amount of hard disk space required and can take as long to write as the CD itself.
- Use multisession support selectively. Although most CD-ROM drives built in the last two years can play a multisession CD, many older drives see only the first session. (All of the double-speed drives Apple has included in the Mac play multisession CDs.) If you don't know which drives will be used with your CD, write the entire CD in one session.
- Test your CDs. Even if your software lets you simulate playback on a CD-ROM drive, test your CD in a real CD-ROM drive or two before you mail it to your boss or client.

The Last Word

CD-R is a technology in transition. Pinnacle Micro (714/727-3300) stopped selling its CD-R software and single-speed (150-KBps) drive during our testing period, for example, and as we went to press Pinnacle began offering new software and a double-speed (300-KBps) drive that the company claims will simplify data backup. Electroson (610/617-0850) pulled out of our evaluation when we ran into difficulty with its Gear 2.3 software. The company says the $995 Gear 2.4 addresses 2.3's shortcomings; 2.3 failed to properly handle aliased files, causing the system to crash while writing the CD. Eastman Kodak chose not to send us products, although it has been announcing a six-speed (900-KBps) drive for some time now.

Many of the companies that sent us products plan to upgrade, replace, or discount current products by the time you read this. Faster and less expensive drives are coming from JVC, Pinnacle, Sony, and others. Sources say that by this summer some drives may cost less than $1500.

No matter what products are available when you begin your CD-R search, the key is first to see which software best suits your needs and budget. Then look for the lowest price you can find on compatible hardware.

JVC's lower-end Personal Archiver ($2695) is reasonably priced, easy to use, and dependable. Although JVC sent us a single-speed drive, the company says that Personal Archiver now comes with a double-speed drive and ten 74-minute blank recordable CDs. There are limits: you can't make hybrid CDs, and you have no control over the selection or placement of files and folders; you must copy an entire volume onto the CD. Personal Archiver lacks CD-ROM emulation, but it does offer automatic ISO 9660 naming and verification.

A step up the ladder, we found JVC's Personal RomMaker ($6595) to be a nicely integrated system that includes a dedicated 1GB hard drive, particularly now that the JVC drive is double-speed. You gain much more control over the choice and position of files in both HFS and ISO 9660 formats. RomMaker is a powerful program, but you should be prepared to invest some time learning and experimenting. The clear and extensive 225-page manual made the learning curve long but not steep.

For speed demons, the quadruple-speed Yamaha drive ($5500) coupled with OptImage's CD-It All program ($1995) is a nifty combination. (You can get the same software, under the Toast name, with a double-speed Plasmon drive, for $3850.) The drive is pricey, but it is also fast and supports multisession CDs. The software supports HFS, ISO 9660, hybrid, and audio formats. If you're transferring HFS files to the CD-ROM drive, you'll need a large hard disk to hold the entire disk image before writing to CD, since CD-It All and Toast let you select and place only ISO 9660 files. We liked the software's clean interface and dependability.

Given the relatively high entry cost for CD-R systems and the fact that none contain all the features we feel are necessary for efficient and consistent CD authoring, we are not recommending any package as Editors' Choice. But for those pioneers willing to invest time and money, CD-R is a reality today. If the many features that are promised in future releases of both CD-R software and hardware are realized, CD-ROM publishing should prove a thoroughly viable alternative to the use of CD service bureaus. m

CD Emulation	Tests ISO Names	File Placement	Multisession	Phone	Toll-Free Phone
yes	no	with text file	yes	617/621-0820	800/344-5849
yes	yes	ISO 9660 only	no	408/379-2400	800/774-6228
yes	yes	HFS and ISO	yes	714/261-1292	none
no	yes	no	yes	714/261-1292	none
yes	yes	no	no	408/376-3511	800/347-2644
yes	yes	ISO 9660 only	yes	515/225-7000	800/234-5484
yes	yes	no	no	408/432-0190	800/352-7669

[D] *Includes CD-R drive and ten recordable CDs.* [E] *Hybrid option available for $395.* [F] *Also sold under the name Toast, by Plasmon.*

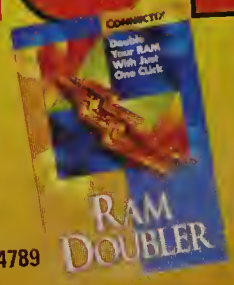
JIM FEELEY is a *Macworld* assistant editor who follows multimedia authoring, video editing, and related technologies.
SUZANNE STEFANAC is editor of Macworld Online and is a firm advocate of the electronic dissemination of information.

RECORDABLE CD SYSTEMS

In evaluating CD-R systems, we expect the software to offer a simple interface, strong data-preparation features, and control of the file placement, together with support for double-speed (2X) and 4X CD-R drives. We expect CD-R drives to offer multisession recording capability and offer simple connection to the Mac. Although several products in this new class of technology showed promise, no CD-R software yet meets all our criteria for an Editors' Choice. For CD-R drives, the differences among drives was not meaningful enough to single out one over the others.

HOT!

17541



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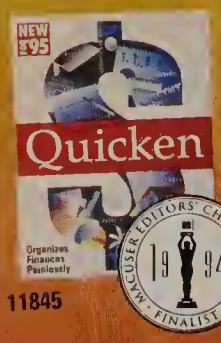

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17446	Global Village TelePort Gold II	139.95
14767	Global Village TelePort Mercury	299.95
11419	Hayes ACCURA144+FAX144	124.95
18188	Hayes OPTIMA V.34+FAX144	469.95
11156	Lynx Ring Director RD-200	69.95
4879	Practical Periph MC144MTII	119.95
17968	Practical Periph MC288MTII V.34	229.95
7639	STF Tech. FAX*stf* 3.1	64.95
5337	Supra SupraFAXModem 144LC	139.95
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11842	U.S. Robotics Sportster 14.4 Fax	129.95
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16390	Ventana Press Internet Mem. Kit	49.95
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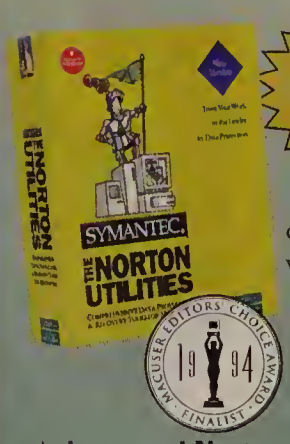

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EDITED BY CATHY ABES

Graphics

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Umax Introduces High-Resolution Flatbed Scanner

UMAX TECHNOLOGIES' GEMINI D-16 is the first color flatbed scanner to deliver both 30-bit image capture and output, and an optical resolution of 800 by 1600 dpi, for images up to 4¼ inches wide, according to the company. The Gemini D-16 accomplishes the high resolution at a competitive list price ($1995) through a dual-lens, single-CCD design. One lens magnifies a large scanning area, 8½ by 11 inches, which the CCD captures at 400 by 800 dpi. A second lens captures a much smaller area, 4¼ by 5½ inches—the approximate size of most transparencies—at 800 by 1600 dpi.

Instead of downsampling the image to 24 bits, as other high-bit scanners do, the D-16 maintains its full bit depth via an updated version of Umax's MagicScan software—enabling it to deliver 30-bit images to applications such as Adobe Photoshop. Features of MagicScan 1.2 include batch scanning, descreening (to eliminate moiré patterns), three levels of unsharp masking, improved zooming on scan previews, and the ability to control the highlight values of an image before scanning. (MagicScan 1.2 produces 30-bit images from Umax's PowerLook scanner as well; for more on the PowerLook, see "Scanning Beyond 24 Bits," in this issue.) The Gemini D-16 also ships with Umax's MagicMatch software for on-the-fly color calibration, Photoshop 3.0, and a limited edition of HSC Software's Kai's Power Tools. An optional transparency adapter is available for $595.

The one-pass scanner boasts a 1MB output buffer and an enhanced microstepping technology for fast scanning speeds. According to Umax, the Gemini D-16 can capture an 8½-by-11-inch reflective color image at 400 dpi in 20 seconds. The Gemini D-16 is expected to ship by early January 1995. Umax, 510/651-8883.
—JAMES A. MARTIN

TOM GIBSON

Radius Revamps SuperMac Cards

THE RECENT RADIUS-SUPERMAC merger has borne its first jointly developed product: an enhanced line of SuperMac's Thunder II graphics cards. The Radius Thunder IV series, slated for early January release, supports 24-bit color on monitor resolutions up to 1600 by 1200 pixels and accelerates 24-bit QuickDraw operations.

The 7-inch NuBus Thunder IV boards include Radius's Photo Engine daughtercard, which features four 66MHz, 32-bit DSP3210 chips for accelerating Adobe Photoshop filters, as well as a 10-bit digital-to-analog converter for 30-bit color display. The boards ship with Radius's Dynamic Desktop software—which offers hot-key resolution, bit-depth switching, and hardware pan and zoom—and ColorComposer, a color-matching utility. The Thunder IV GX1152 ($2499) supports 24-bit color on monitor resolutions up to 1152 by 870; the Thunder IV GX1360 ($2999) up to 1360 by 1024 pixels; and the Thunder IV GX1600 ($3699) up to 1600 by 1200 pixels.

Radius has also announced the Thunder/24 GT graphics card ($1799), which offers 24-bit color and QuickDraw acceleration on monitor resolutions up to 1152 by 870, but with no option for a Photo Engine daughtercard. Radius, 408/541-6100.—JAMES A. MARTIN

Third-Party Plug-in Filters for Illustrator

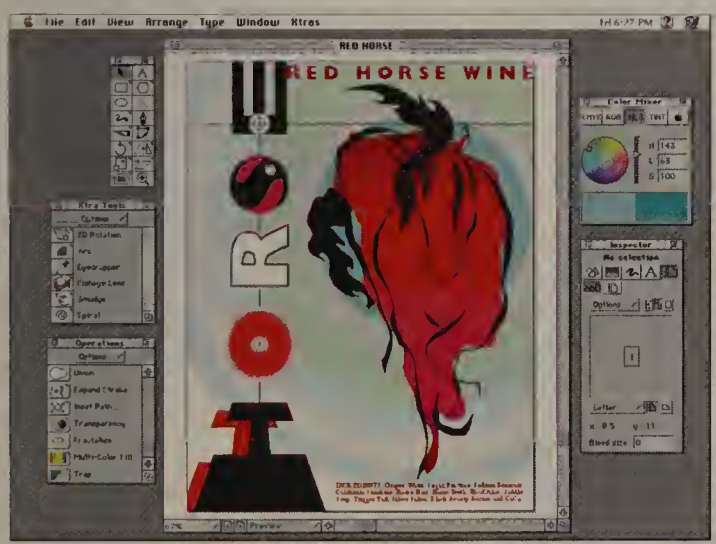
HANK OSUNA

A NEW DUTCH COMPANY, SCARLET Graphexx BV, is now shipping two sets of plug-ins for Adobe Illustrator 5.0 and 5.5, with more on the way. The first set, SG Relief ($99), consists of seven filters that give Illustrator objects a three-dimensional appearance. You can project an object onto any of six predefined shapes (globe, cone, cylinder, water, amplified waves, or diamond); SG Relief also extends Illustrator's Free Distort filter for defining three-dimensional shapes on the fly.

SG ToolBox 1 ($44) is a five-filter package that lets you quickly move multiple Illustrator objects to any level, or across multiple levels, while maintaining the objects' original coordinates. A calculator function lets you resize, rescale, and reposition any selected object or image using values and percentages; you can toggle between common measurements (such as picas and inches) using keyboard commands, without changing preferences in a dialog box. Scarlet Graphexx BV, 011-31-34-626-6258; fax 011-31-34-625-0238.—JAMES A. MARTIN

Macromedia Opens Up FreeHand

IN ITS FIRST INCARNATION as a Macromedia product, FreeHand 5.0 probably won't seem as radically different from 4.0 as that version was from its predecessor, but it will sport some major new features. For veteran FreeHand users, the most exciting improvements to version 5.0 are likely to be its open architecture, expanded text capabilities (including styles, a search-and-replace function, and a spelling checker), more-powerful color controls, and major speed improvements in screen redraw and text entry.



Macromedia FreeHand 5.0's new features include interactive tools such as fish-eye lens and 3-D rotation, improved text capabilities, and the use of multicolor gradients.

FreeHand 5.0 will support Illustrator plug-ins as well as its own drop-in interactive tools—Xtras such as 3-D rotation, transparency, fish-eye lens, smudge (which works like the blend tool), and eyedropper (which lets you drag colors from a scanned TIFF image and drop them onto a FreeHand palette or object). And its new open architecture should motivate third-party vendors to write additional FreeHand plug-ins. Color enhancements include global CMYK color adjustments and the ability to create multicolor gradients.

Other useful features are the enlarged (22-by-22-foot) pasteboard; magnification levels up to 25,600; multiple views of a file; and the ability to generate reports describing a file's fonts, colors, and embedded and linked objects.

The program requires a minimum of 5MB of application RAM, though 8MB is preferable. Although it will work on a Mac IIci and with System 6.0.7, a Power Mac and System 7 are recommended.

Due out in January, FreeHand 5.0 will retail for $595 ($149 to upgrade) and include Power Mac and 680X0 versions on the same disk. For the first quarter of 1995, users of Adobe Illustrator, Canvas, and MacDraw Pro will be able to buy FreeHand 5.0 for $199. Macromedia, 415/252-2000.—C.A.

IN BRIEF

■ **La Cie Scanner** La Cie is now shipping the Silverscanner III ($1499), with 30-bit image capture and optical resolution of 600 dpi. Features include full gamma-correction controls and the ability to adjust scanning resolution in 1-dpi increments. Also available are an automatic document feeder ($499) and a transparency adapter ($799). 503/520-9000.

◀ **Design Your Own Filters** HSC Software's KPT Convolver ($199) lets you design custom filter effects. After experimenting in Explore mode to find the general effect you want, you refine it in Design mode. Finally, in Tweak mode, you individually fine-tune each filter parameter and preview the results on your image. KPT Convolver is due to ship for the Power Mac in January 1995. 805/566-6200.

■ **Switching Over to Illustrator** If you're a FreeHand user who'd like to try Illustrator, now's the time. From January 1 through February 28, FreeHand owners who call a special toll-free number and provide their serial numbers can get Illustrator 5.5.1 for $149. The new version fixes text bugs, improves speed, and accommodates Acrobat 2.0 file-format changes. ATM 3.8.1 and Type On Call 4.0 are also included. Adobe Systems, 800/521-1976.

■ **Art on the Net** Alphabets' designOnline—an online service for computer-based artists—has put its forums and content on the Internet via the World Wide Web. Forums include a Digital Gallery for uploading and exchanging portfolios; the Kiosk, for posting help-wanted ads, events, and public-notice information; a folder for the American Institute of Graphic Artists; and a products area, with Alphabets fonts for purchase. For Internet access, Alphabets offers a graphical Mac program, FirstClass Client 2.6 (available from Alphabets or downloadable by dialing 708/328-8723). To use it, however, you must have a designOnline subscription ($45 for three months; $80 for six months; $155 per year). 708/328-2733.

Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Based in Seattle, Jeff Brice is a digital artist and designer who has done computer graphics for over ten years. His clients have included Microsoft, J. P. Morgan, *Newsweek*, IBM, Paine-Webber, and CompuServe.

How It Was Done: For this month's feature on writable CD-ROMs, Brice began by drawing a circle in FreeHand, which he duplicated five times. After reducing some circles and enlarging others to make a series of concentric circles, he cut each one with the knife tool, then saved the finished element in Illustrator format so he could bring it into Photoshop.

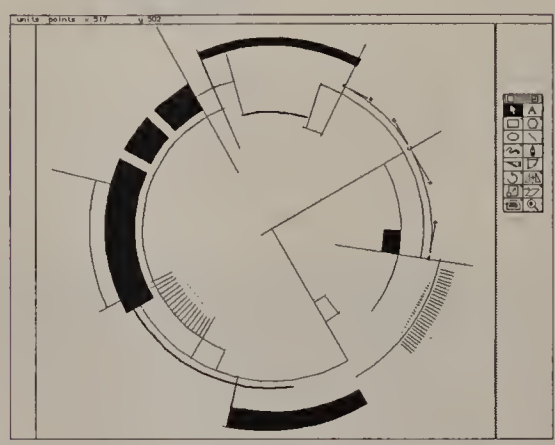
There he copied the lines to an alpha channel. In the RGB channel he loaded the selection and then deleted it (with the background color set to black), which left only black, white, and red circular shapes.

For the CDs, he created two masks in Photoshop; one for the small CDs on the right, another with a linear gradation for the large one.

After creating a text block in FreeHand, Brice converted it to paths to make the type into a graphic element. Next, he opened Dimensions and created a cone-shape object; after importing the type, he mapped it onto the cone, scaling and distorting it to cover the cone and add perspective.

Back in Photoshop, Brice rasterized the cone, then inverted it (to make the type white and the cone black) and copied it to an alpha channel. Deleting everything in the RGB file so that it contained only white—the background color—made the type into a mask ready to be brought into Collage.

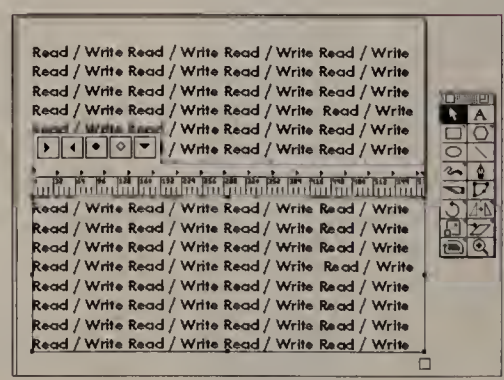
In Collage, Brice rotated and skewed the circular element and composited it with the CD and the background using the Difference method, which inverted the colors beneath the black areas in the element, resulting in the blue, red, purple, and black horizontal bands. After rotating and skewing a duplicate of the circular element at different angles, he composited the duplicate using the default Copy method. m



1 The original FreeHand drawing of the circular object.

2 In Photoshop, Brice gave the mask of the circular object a linear gradation of 45°, which allowed the background to show through on the left side.

3 The circular object's RGB channel after the selection was deleted.

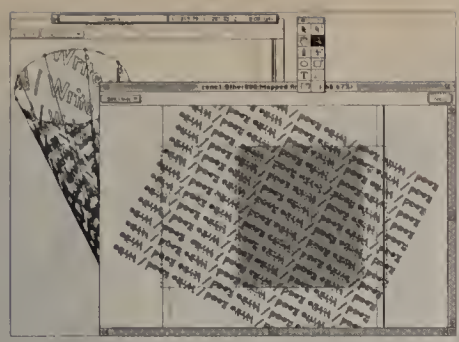


4 The Helvetica text block Brice typed and duplicated in FreeHand.

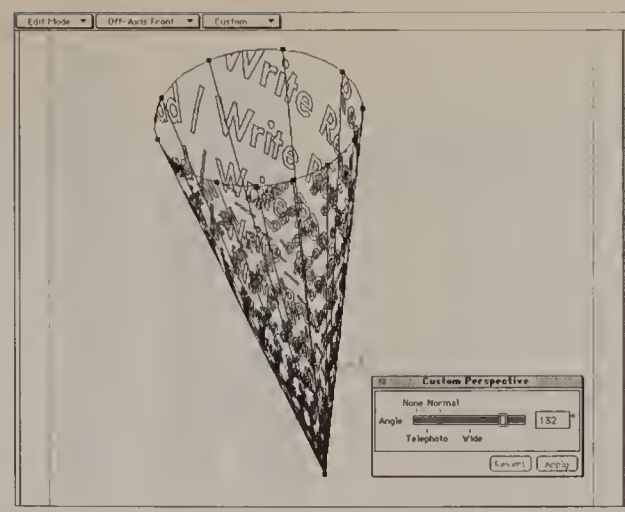
THE TOOLS

Hardware: Macintosh Quadra 650; 100MB of RAM, a 2GB hard drive; Umax UC630 scanner; NuDesign 128 MO, APS DAT, and Micronet 44 SyQuest drives; 17-inch and 13-inch Sony monitors; HP DeskWriter 550c.

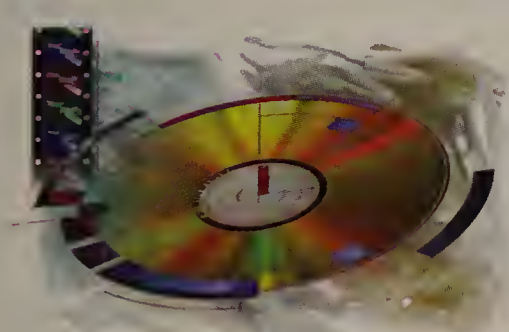
Software: Macromedia FreeHand 4.0; Adobe Photoshop 3.0; Specular Collage 2.0; Adobe Dimensions 2.0.



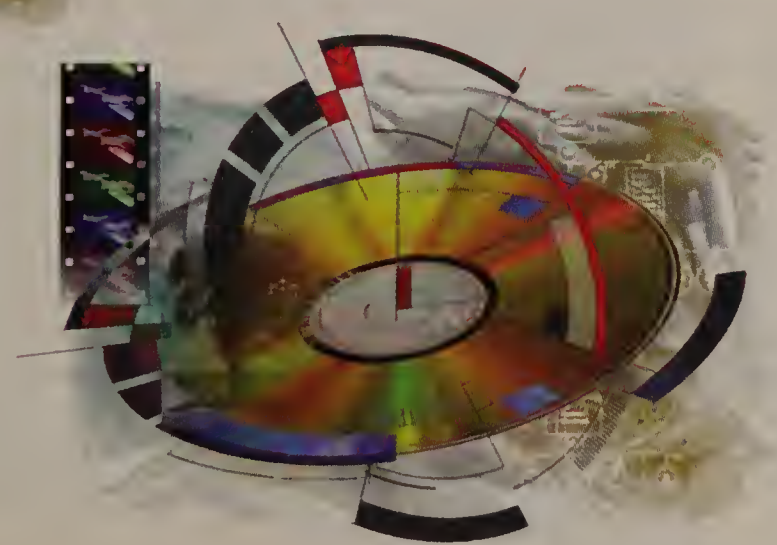
5 In Dimensions, Brice mapped the type onto a cone (shown here in 2-D view) using the Map Artwork command (Appearance menu) and scaled it up to completely cover the cone's surface.



6 Choosing Perspective (View menu), he created a custom perspective (Custom option) by moving the slider to 132° to create a wide-angle view.



7 After rotating the original circular element 45° and skewing it –35°, Brice composited it with the CD and the background using Collage's Difference method.



8 Brice rotated the duplicate circular element (–10°), skewed it (–10°), and composited it with the original element, the CD-ROM, and the background.

EDITED BY DAN LITTMAN

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

The Calculating PIM

THE STANDARD MODEL FOR PERSONAL information managers is a database for recording contacts, a calendar for scheduling when to call them, and links between the two. But add a spreadsheet to the mix, with the ability to merge database information into a worksheet, and you're ready to manage some pretty serious personal info.

That's what Magic Merge does. By transferring information from the database to the word processor, it can churn out form letters, labels, and so on; by transferring database information to the spreadsheet, it can perform calculations and generate forms, invoices, and so on. While the database is mostly as limited as an address-book program, it can track financial transactions. Mail Merge can schedule phone calls but does not have a normal to-do list or calendar.

Magic Merge 2.0 should be available by the time you read this for $149. At press time the developers hoped to, but were not certain they would, complete repeating fields and lookups for version 2.0. D & D Computers, 305/220-6848.—D.L.

STUART BRADFORD

Real-Time Group Conferencing

A NEW GROUP-CONFERENCING APPLICATION from Mainstay, code-named Gossip, enables participants to communicate using text and graphics in real time, without a high-bandwidth network or additional networking hardware.

Although Gossip supports Ethernet, a user can participate with only a LocalTalk or ARA connection. Gossip has three windows: the Conference window displays and scrolls text as participants type in their comments; the Fax window displays a word processing page, a spreadsheet, or an image such as a 72-dpi color or gray-scale graphic; and the Whiteboard window displays a document for users to comment on with Gossip's basic draw tools. Any participant can display a document in the Fax window by dragging it in after first saving it as a PICT or TIFF file. No one in the conference can edit the Fax window file; anyone can edit files in the Whiteboard window, but only the conference administrator can add a file to that window. Changes made to a Whiteboard graphic can be printed or saved as a new PICT or TIFF file.

Mainstay expects to ship Gossip early in 1995; prices for client and server versions weren't available at press time. Mainstay, 805/484-9400.

—JAMES A. MARTIN

Data Access Sans SQL

BLYTH SOFTWARE'S TRUEACCESS IS A client/server query tool that promises easy, efficient access to companywide databases. TrueAccess produces SQL queries for the host computer but shields the user from SQL coding and the databases searched.

TrueAccess provides point-and-click access to Oracle 6 or 7, Sybase 4 or 10, and SQL Server databases via graphical windows. Query results are returned as a table or graph and can be directly imported into analysis applications such as Microsoft Excel. TrueAccess lets database administrators maintain multiple levels of security and control. With TrueAccess,

A preconstructed SQL query being assigned to an entire department in one step with Blyth's TrueAccess.

administrators can apply security at the column, query, user, group, or database level. Security information, aliases, descriptions of database objects, and queries are grouped by user function and stored in TrueAccess. Available now for Macs and Windows, TrueAccess administrator kits are $1799 each; end-user kits are $299 per client. Blyth Software, 415/571-0222.—JAMES A. MARTIN

Personal, Portable Videoconferencing

RSI SYSTEMS SAYS ITS ERIS PERSONAl Video Communications System is the first desktop-videoconferencing product that lets Macs videoconference with Windows machines over either ISDN or analog telephone lines.

Eris is a portable, self-contained SCSI or PC Card peripheral device; because ISDN connectivity and a 28.8-Kbps V.34 modem are included inside the box, users can easily move the Eris system from one location to another. Video performance is significantly slower over analog phone lines, of course, but Eris lets you capture and transmit a succession of high-resolution, JPEG-compressed still images instead for clearer results.

The Eris system includes an AT&T AVP video-compression chip, two AT&T 3210 digital signal processors for audio, 5.5MB of memory, and a speakerphone. Eris supports all international audio and video standards, and RSI says the system is compatible with any standards-based videoconferencing hardware and software. The system ships with a VHS-quality camera but supports any video monitor and camera, as well as a VCR.

The Eris software employs a photo-based phone book as an interface. A user can adjust the video window to any size, switch the view from one video camera to another when more than one camera is in use, and place one video picture within another. Eris's software also allows users to share documents from any application during a videoconferencing session, regardless of platform, but only the user who launched the document can make changes. Eris doesn't work over LANs and supports only two computers at a time.

Eris should ship in January for $4995. RSI Systems, 612/896-3020.
—JAMES A. MARTIN

IN BRIEF

■ **JetForm's New Functions** The latest version of JetForm Filler for Mac supports on-screen buttons that, when clicked on, launch specified tasks such as transmitting a completed form over E-mail. Version 4.0 also enables users to annotate forms with on-screen sticky notes; track forms routed over E-mail; and import and export data from Oracle, dBase, FoxPro, Sybase, Clipper, and SQL Server databases. JetForm Filler 4.0 for Mac, available now, is $129 for one user and $495 for five. JetForm Corporation, 617/647-7700.

■ **FedEx at Your Fingertips** Beginning in early 1995, you'll be able to request a Federal Express pickup, fill out and print bar-coded shipping labels, get a rate quote, and check on the status of your package—all with a modem-equipped Mac and FedEx Ship, the express-delivery service's first foray into software for small businesses. FedEx Ship will be available free over America Online and CompuServe or directly from Federal Express, and access will be via toll-free lines. 800/817-8300.

■ **Brio's Query Tool** Brio Technology's new BrioQuery is a client/server query and data-analysis tool that combines the features of Brio's earlier DataPivot and DataPrism in a graphical, multiple-window interface. BrioQuery offers native support for Oracle, Sybase, Red Brick Warehouse, and SQL Server databases, and lets users easily perform ad hoc SQL searches and create banded reports. BrioQuery Designer ($2495) is for building and deploying database models; BrioQuery Navigator ($595 per user) lets users construct queries from those models; and BrioQuery Explorer ($595 per user) can query a variety of live SQL databases. 415/961-4110.

Newton Sprouts Again

WHILE THE PERSONAL DIGITAL ASSISTant (PDA) hasn't swept the world with VCR- or Walkman-style success, Apple's Newton MessagePad PDA is slowly but steadily gathering momentum. Apple is about to release the MessagePad 120; Panasonic, Siemens, Toshiba, and Motorola are developing Newton-based PDAs; and the list of Newton software and the Newton communications infrastructure are growing.

The 120's main improvements include a clearer screen, a removable lid, and an option for 2MB of memory. U.S. pricing and ship date were not available at press time. Apple is also working on a replacement for the Connection Kit, to be ready after the 120 rollout.

New Newton applications of note include Tabula Rasa, a forms-design package, and Equate, a general-purpose spreadsheet. Tabula Rasa ($249, Brand X Software, 804/355-0374) is intended for mobile data collection—surveys, inventory, medical record-keeping, and so on. It provides about 20 field types, including multiple-choice and true/false, tables, and bar codes, as well as some simple statistical analyses. Equate ($99, Holosoft, 408/748-9648) has a zoom-out view for navigating large worksheets. Equate lacks a macro language, graphing, arrays, and some other high-end features, but its function list is similar to Excel's, and the program is designed to import and export Excel worksheets.—D.L.

A Newton MessagePad 120 with its lid removed. On screen is a spreadsheet in Excel-work-alike Equate.

ROBERT PERRY

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ADOBE ILLUSTRATOR 5.5

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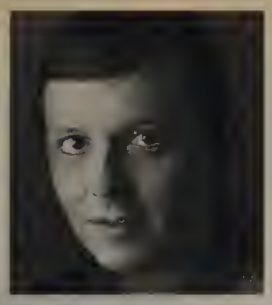
Circle 231 on reader service card



BY JIM HEID

Working Smart

Business Information in Cyberspace

THIS MONTH'S *WORKING SMART* IS THE 120th consecutive column I've written for *Macworld*. For ten years I've had the good fortune not only to cover the Mac as it evolved from an underpowered and overpriced toy into a powerful force in the computer industry, but to do so from a home office.

The most familiar sound in that home office is my modem's shooting the breeze with another modem. Besides going online to turn in stories, swap E-mail, and scarf up the latest freeware, I've used the modem as a research tool to keep up with industry news and learn about new technologies and products. These days, a modem is as essential a business tool as a pinstripe suit (or, for us home-office workers, a pair of warm slippers).

What's Out There?

At the other end of a modem lies a gold mine of business information. Not just current stock quotes and timely news from major wire services—two things often cited as good reasons to use (and tax-deduct) a modem. I mean *real* business information, such as the following:

- Demographic data.
- Abstracts and full-text articles from major newspapers and hundreds of business, industry, scientific, and medical newsletters.
- Corporate data, such as disclosure statements filed with the Securities and Exchange Commission.
- Data from the federal government.

Many of these information gold mines are available on eWorld, America Online, and CompuServe. (Throughout this column, I list the shortcut keywords for each forum mentioned.) Some of the best libraries and databases, however, are on the outskirts of cyberspace, in specialized business and research services such as NewsNet and Dialog.

eWorld's Offerings

Given that eWorld is a relative newcomer with fewer subscribers than the competition, I didn't expect to find much in the way of eBusiness eInfo. I was eSurprised: the Business and Finance Plaza has a solid foundation of basic business offerings—and access to all of them is included in the basic eWorld subscription rate.

Much of eWorld's business information is geared toward small businesses and home-office workers. For example, there's Working Solo (shortcut: solo), a forum for entrepreneurs and home-business operators looking for guidance and connections. The forum's software libraries contain business-oriented templates for popular application programs. For online networking, there's an Introductions area where you can post a brief résumé and list of services you offer. *Inc. Magazine* also operates a forum (shortcut: inc online) containing entrepreneurial tips and magazine excerpts.

Another useful forum for small-business types is the Nolo Press Self-Help Law Center (shortcut: nolo), where you can read interesting (and understandable) articles on topics such as incorporation, patent, and contract law, and post questions for Nolo Press's legal staff to answer. Of broader interest on eWorld is the Business Sector Profiles forum (shortcut: bsp), operated by The Reference Press. Business Sector Profiles contains expanded and annotated versions of reports and forecasts issued by the U.S. Department of Commerce for more than 200 industries.

Similar, though less comprehensive, reports are also available in the Vital Statistics section of the Real-Time Marketing forum (shortcut: rtm) operated by Regis McKenna, a marketing and public relations firm. If you are in the advertising biz, visit the Ad Age/Creativity Online forum (shortcut: ad age) run by Crain Communications, which publishes *Advertising Age* and *Creativity* magazines.

If you're looking for company information, check out the Hoover's Company Profiles forum (shortcut: hoovers). This forum, also operated by The Reference Press, contains nicely done profiles of nearly 1000 public and privately held corporations—overviews, founder's names and company histories, headquarters addresses, lists of divisions, and more.

An American Online

Most of the business information offerings on America Online (AOL) are in the News & Finance area.

The Hoover's Business Resources are available on AOL (keyword: hoovers), as are the Hoover's Company Profiles (keyword: company). If you're a fan of public television's "Nightly Business Report," you might enjoy NBR Online (keyword: nbr), which contains transcripts of selected NBR interviews and commentaries,

continues

business news summaries, and reports on market trends.

If your company is a federal contractor, check out Commerce Business Daily (keyword: cbd), which lists notices of proposed government contract awards for amounts in excess of $25,000, as well as sales of government property and other procurement-related tidbits. Each edition contains approximately 500 to 1000 notices—proof that your tax dollars are at work.

Anyone who works in the publishing or communications industry should visit the Cowles/SIMBA Media Information Network (keyword: cowles). The Cowles/SIMBA Media Daily contains stories on everything from book and magazine publishing to cable-and-telephone-company wars to satellite broadcasting. The forum's bulletin board is active with debates on media-related issues.

Business-news junkies will be in heaven on AOL. The Top Business window (keyword: business) lets you read current news by industry or search for articles containing keywords you specify. And forums are operated by *Worth* magazine (keyword: worth), the *New York Times* (keyword: nyt), the *San Jose Mercury News* (keyword: mc news), and the *Chicago Tribune* (keyword: chicago). Generally, these free forums offer only a subset of their respective publications; as I'll describe later, the full text of many publications is available, but it'll cost you.

SEARCHING SMART

Say you're interested in snagging stories on Mexico, but you aren't interested in news on Mexican sports. You specify the search criteria **Mexico not sports**, and the result comes back littered with articles on New Mexico high-school football. It's at times like these that you realize just how sophisticated the human search engine is compared with an online service's. And the killer, is you must pay for these items.

(1) Be extremely specific about what you are looking for—spell it out in detail. In the preceding example, instead of specifying **Mexico not sports** you might specify **Mexico not football or baseball or basketball or soccer or tennis**. You might also specify **not "New Mexico"** (many information services require you to enclose multiword phrases in quotes), although doing so would exclude an article titled "President Zedillo Promises a New Mexico."

(2) Specify the databases to search if your information service permits that.

(3) When the service returns a list of citations, retrieve the full text of the articles you want at this point to avoid repeating the search later at additional cost.

(4) Hire an information broker—a professional trained in online research. You'll pay for the researcher's time, but the savings in connect time should easily pay for itself. (Information brokers are listed in the yellow pages under Information Retrieval Services or something similar; some online services also provide referrals.)

Sleepless in CompuServe

eWorld and America Online look like small-town libraries compared with the granddaddy of personal computer information services, CompuServe. You can spend days exploring CompuServe's business information offerings.

CompuServe's Business menu (shortcut: go business) is the gateway to dozens of profession-specific forums. Among them: a work-at-home forum (go work), a public relations and marketing forum (go prsig), an inventors' forum (go innovations), a legal forum (go lawsig), an office-automation forum (go oaforum), an international-trade forum (go trade), and a court-reporters' forum (go crforum). As with the forums on eWorld and AOL, these forums are available to all subscribers at no additional charge.

Newshounds will howl over CompuServe's online newspaper and magazine offerings. The Associated Press wire service is available (go aponline), and news stories are updated hourly. The Business Wire (go tbw-1) carries company information and press releases. And researchers will want to explore the newspaper archives (go newsarchive), which let you search for and download full-text articles from more than 50 American and British newspapers dating back to the late 1980s. The News Source USA area (go newsusa) provides a similar service and adds archives of a dozen or so major magazines, from *People* and *Sports Illustrated* to *Fortune* and *Forbes*. In the Magazine Database Plus area (go magdb), you can search for and retrieve articles from 140 magazines—everything from the *New Republic* to *Cosmopolitan*.

Equally impressive is CompuServe's range of reference materials. You can get TRW credit reports and business information on more than 13 million organizations (go trwreport). You can get astonishingly detailed demographic data on cities, towns, neighborhoods, census tracts, Nielsen TV-ratings areas, and more (go demographics). You can search every phone book in the country (go edu-8). The full text of the *Commerce Business Daily* is also available (go combus), as are searchable versions of *Books In Print* (go bip) and Marquis *Who's Who* (go biography). And the IQuest service (go iqu-1) is a collection of nearly 1000 databases in every imaginable category. Type in search keywords that describe your area of interest, and IQuest will return either a list of article citations (including publication name, date, author, and title) or the full text. For expert advice on crafting a query, type **SOS**, and an IQuest representative will help you.

Note that many of the best reference resources on CompuServe carry additional surcharges. Some services carry an additional hourly charge of up to $24, others charge for each article you retrieve or each search you conduct, and still others combine both approaches. All premium-priced services provide menu options that describe pricing details and provide tips on searching.

The Big Guns: Dialog, NewsNet

Two of the information services available through CompuServe gateways, Dialog and NewsNet, are also available directly. Dialog (415/858-2700, 800/334-2564) is the world's largest online bibliographic company, with over 200 million searchable items spread across 370 databases. Databases include the full text of 33 major newspapers, as well as scientific journals; government, business, and corporate publications; and law and reference books. You can retrieve the full text of articles electronically or even have them mailed or faxed to you.

Dialog can be daunting. Besides the vast array of searchable materials, the service's interface is archaic, relying on cryptic typed commands. Conducting searches is an art in itself; choose keywords carelessly, and you can wind up with hundreds of irrelevant citations.

Dialog's Knowledge Index is a subset of the full service specializing in science and education. Knowledge Index is available only through CompuServe (go KI); you'll have to pay a $24-an-hour surcharge for access.

NewsNet (610/527-8030, 800/345-1301) specializes in business information, providing full-text access to 700 business and industry publications and 20 international news wires that together post 17,000 new items every day, according to the company. Here you'll find not only mainstream newspapers, but ultraspecial-

continues

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- MarketPlace Business ($849, MarketPlace Information Corporation, 617/672-9200, 800/999-9497). Using a powerful search engine, it provides information on more than 9 million U.S. businesses.
- SelectPhone (Pro CD, 508/750-0055, 800/992-3766). Telephone directories including DirectPhone ($149, all U.S. white pages); CanadaPhone ($149, all Canadian white pages); and FreePhone ($49, all U.S. toll-free phone numbers).
- North American Fax Book ($49.95, Quanta Press, 612/379-3956). Includes a directory of 150,000 fax numbers.
- Dialog On-Disc (price depends on database, Dialog Information Services, 415/858-2700, 800/334-2564). More than 60 CDs grouped into subject families: business information, education and humanities, health and biomedicine, law and government, and science and technology.

ized newsletters: *Drug Detection Report*, *Indoor Air Quality Update*, *Pharmaceutical Litigation Reporter*, *Toxic Materials News*, *Wine Business Insider*, and *Asbestos and Lead Abatement Report*. Costs depend on the publication and vary from 40 cents to several dollars per minute of connect time.

For More Information

If I've whetted your appetite for more details on the world of online information, check out Don Rittner's *Whole Earth Online Almanac* (Brady, 1993). It's a superb directory of forums, bulletin boards, online services, and research CD-ROMs. And now if you'll excuse me, my modem is waiting. m

Next month: Speeding up everything

Contributing editor JIM HEID is the author and producer of the best-selling *Macworld Complete Mac Handbook Plus Interactive CD*, third edition, and the *Macworld Ultimate Mac CD-ROM* (both published by IDG Books Worldwide, 1994).

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2. Downloading Files *Weighing Factor: 20%*	✶✶✶✶ Straightforward and user-friendly.	✶✶✶½ Lots of files; hard to find among forums.	✶✶½ Needs better search capabilities.
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Verdict *100%*	✶✶✶✶ So Easy, it's hard to believe you're online.	✶✶✶ Database depth, but not always easy to use.	✶✶ Rock-solid for data, but that's it.

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PC Computing Magazine, September 1994

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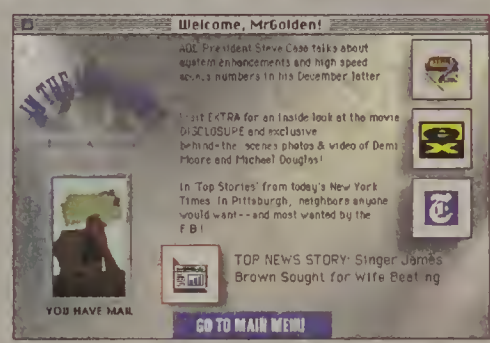

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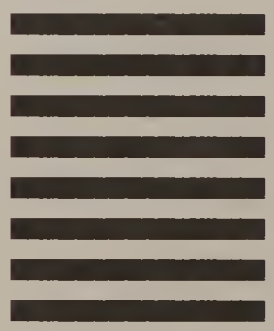

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Quick Tips

Tips, Tricks, and Shortcuts

BY PRESSING ONE KEY YOU CAN EXTEND System 7.5's Find File window to find files and folders that are invisible, have custom icons, contain text you specify, or have names and icons that can't be changed. You expand the leftmost pop-up menu in the Find File window to include these four additional choices by pressing the option key when you first click the pop-up (see "Find File Secret").

Delayed Delivery

If you get a QuickMail message weeks or even months before you need to act on it, *Macworld* senior designer Arne Hurty suggests you forward the message to yourself, delaying the delivery (using the Delay button in the Select Recipients dialog box) until a day or two before you need to take action.

Old Drivers Make Trouble

Q. When shutting down my Mac IIsi (using System 7.5) I often get a message asking me to insert the start-up hard drive. Since the start-up hard drive never ejects, this is quite puzzling. I can work around this by pressing ⌘-control-power-on to restart, immediately holding down the shift key to start up without extensions, and shutting down again. Any idea what's causing this?

Dennis Bye
Cleveland, Ohio

A. The likely culprit is an obscure setting in the disk driver software that governs whether your start-up hard drive is considered ejectable. This problem occurs with old drivers made by Transoft and distributed with Transoft's SCSI Director disk-formatting software, as well as with APS and other makes of hard drives. To confirm that your start-up drive has a Transoft driver, select the drive's desktop icon and choose Get Info from the Finder's File menu. If the Get Info window's Where information contains *NS-SCSI* or *NS-ACAM*, then the drive has a Transoft driver. The problem does not affect APS drives with Power Tools software version 3.0 and later, nor does it affect SCSI Director version 3.0.9 and later.

You can fix the problem by upgrading the driver. If you have a version of APS Power Tools earlier than 3.0, contact APS (816/920-4109, 800/235-3708) for a new driver—which, incidentally, is made by Prosoft, not Transoft. If you have another brand of hard drive with a Transoft driver, contact the drive maker for a software upgrade. You should contact Transoft (805/565-5200, 800/949-6463) only if you wish to upgrade SCSI Director. Alternatively, you could switch to a different brand of driver software, such as Casa Blanca's Drive7.

You can also fix the problem by changing the driver setting with a disk-formatting utility program made by Transoft, such as APS Power Tools 2.8.2 or SCSI Director, to designate the start-up drive as nonejectable. After opening the utility program, select the start-up device and click the Volumes button. In the dialog box that appears, select the start-up volume's icon and click the Configure button. In the next dialog box, turn on the Disable Finder Eject option. Finish by dismissing the dialog boxes, quitting the program, and restarting your Mac.

If you restart with the start-up volume's Disable Finder Eject option turned off, the driver initially marks the volume as ejectable. Then System 7.5's Color Picker extension creates an alias of itself. This alias, which points to the ejectable start-up volume, gets broken at the end of the start-up cycle when the start-up volume is marked as not ejectable. A broken alias like this triggers the paradoxical message that asks you to insert the supposedly ejected start-up volume.

Missing-Cursors Department

Q. My Quadra 610's cursor is so small it's hard for me to keep track of it. Do you know of any program that could make the cursor bigger or bolder?

Norman Sutliff
Kodiak, Alaska

A. The shareware control panel Fat Cursors, by Robert Abatecola, enlarges the arrow cursor and the I-beam. Several freeware programs help you find the cursor regardless of its shape or size. Two of them, Eyeballs and MyEyes,

continues

install a pair of eyes that watch your cursor from the menu bar. FindCursor, ZoomToCursor, and CursorBeacon each create a different type of visual commotion around the cursor when you press a combination of keys. These programs are available through online information services, such as America Online and eWorld, and through some user groups.

Ailing Responder

Q When my mother tries to start up her Mac Classic, she receives a warning that her Responder program file is damaged and must be reinstalled, but I cannot find this file.

Chris Marshall
Sunnyvale, California

A The only Macs that need the Responder file still use System 6 and are connected to a network whose system administrator uses Apple's InterPoll network-management software. Unless your mother's Classic fits this profile, you can safely drag the Responder file from the System Folder to the Trash. To find the Responder file quickly, open the System Folder, choose By Name from the View menu, and scroll down the alphabetical list of files and folders.

If warnings about Responder appear on a Mac that uses any version of System 7, the best fix is to reinstall the system software. This automatically removes the Responder file, since its functionality is built into System 7's System file.

Virtual Memory Turn-Off

TIP Do you hate having to open the Memory control panel when you occasionally need to turn virtual memory on and off? Sure, holding down the shift key during start-up turns it off—and all your system extensions as well. But by holding down the ⌘ key during start-up, you can disable virtual memory and still keep all your extensions. Restarting without the ⌘ key restores virtual memory with its previous settings. No more trips to the Memory control panel.

David Low
Hillsdale, Michigan

Holding down the ⌘ key during start-up may disable individual extensions or control panels. For affected control panels, check the documentation to see if you can change the key that acts as a disabler during start-up.—L.P.

Long Card in a 6100

TIP Although Power Mac 6100s are supposed to be limited to 7-inch NuBus cards, you can make room for a longer card if the 6100 doesn't have an internal CD-ROM drive.

Open the computer and snap the thin metal shielding away from the front of the case. Unplug the power and SCSI cables from the hard drive, push the release lever behind the hard drive, and slide the drive out. Move the hard drive to the empty CD-ROM bay, securing it in place with double-sided foam tape. The drive stays attached to its plastic sliding tray, so you can easily return it to its original spot.

Now there's plenty of room for a long NuBus card—and not much room to argue whether your warranty is valid.

Ross Johnson
South Lake Tahoe, California

System Folder Annex

TIP If your System Folder becomes too large for your start-up disk, you can move large items such as the After Dark Files folder (mine is 17.5MB) to a non–start-up disk. After copying an item from the System Folder to the non–start-up disk, make an alias of the copy (not of the original in the System Folder). Drag the original item from the System Folder to the Trash, drag the alias from the non–start-up disk to the location that the original item formerly occupied in the System Folder, and give the alias the same name as the original item. For example, an alias of the After Dark Files folder must be named After Dark Files and put in the Control Panels folder.

Dave
via America Online

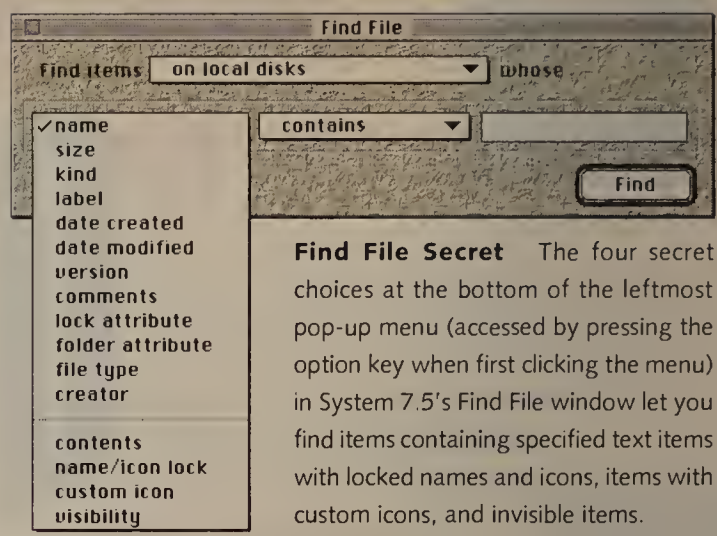
This technique works with the Claris folder (5.6MB on my disk) and with ClarisWorks 2.1, FileMaker Pro 2.1, MacDraw Pro 1.5, and MacWrite Pro 1.5. It does not work with the Aldus folder (6.2MB on my disk) or with PageMaker 5.0.—L.P.

Printing the Right QuarkXPress Pages

TIP Here's how to print a single page or a range of pages from a QuarkXPress (version 3.2 or later) document having more than one section that starts at page 1.

Display the Document Layout palette, and note the numbers it shows below the page icons of the first and last pages you want to print. Use those numbers, prefixing each with a plus sign, to specify a page range in the Print dialog box (see "Absolute Page Numbers"). You may not get the pages you want if you use section page numbers, which are displayed in the lower-left corner of the document window (and in the lower-left corner of the Document Layout palette of Quark 3.3 and later versions).

Gary Hatt
Covina, California

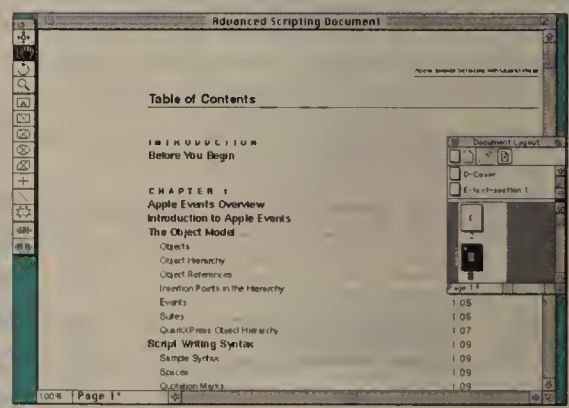


Find File Secret The four secret choices at the bottom of the leftmost pop-up menu (accessed by pressing the option key when first clicking the menu) in System 7.5's Find File window let you find items containing specified text items with locked names and icons, items with custom icons, and invisible items.

Word 6 Tool Bar Manager

TIP Microsoft managed to create a tool-bar nightmare with Word 6.0. Turning on all the available tool bars leaves little room for word processing. You can increase the space available for document windows by double-clicking anchored tool bars to make them floating, resizable palettes. You can also create a custom tool bar that shows other tool bars (see "Tool-Bar Tamer"). Here's how:

1. For each tool bar you want to control from the Toolbar Manager tool bar, record a macro that turns on that tool bar.
2. Use the Toolbars command in the Views menu to create a new tool bar named Toolbar Manager.
3. Word automatically displays the Customize dialog box so you can add buttons to the new tool bar. In the Customize dialog box, scroll down the Categories list until you see Macros, and click it. A list of the macros you have recorded appears in the dialog box.
4. Drag one of the macros to the new tool bar. Word creates a blank button that



Absolute Page Numbers The QuarkXPress Document Layout palette displays an absolute page number below each page icon, and the outlined number indicates the page currently displayed. An asterisk in a page icon means the page begins a new section. Use absolute numbers, prefixed with plus signs, to specify a page range for printing part of a multisection QuarkXPress document.

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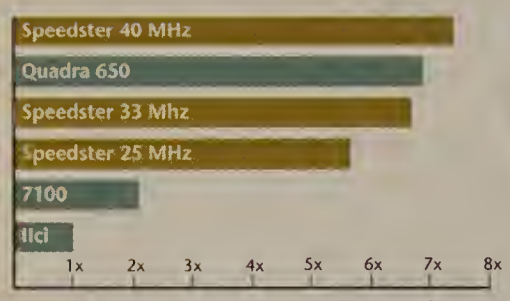

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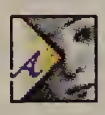

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activates the macro and displays the Custom Button dialog box so you can assign an icon or a name (by choosing the text-button option) to the blank button. Then click the Assign button.

5. Now you can replace the icon you just picked by copying the icon of any button you see and pasting it onto the button you just created. To copy a button's icon, control-click the button to pop up a Word shortcut menu, and from that menu choose Copy Button Image. Then control-click the button onto which you wish to paste the copied icon, and choose Paste Button Image from the pop-up shortcut menu.

6. If you don't see an icon you like, you can use the Customize dialog box to browse through all the available button icons. Simply scroll to the top of the Categories list (where you previously selected Macros) and select each category in turn to see its associated buttons. When you see a button you like, drag it from the Customize dialog box to any tool bar. After copying and pasting the button's icon as described in step 5, remove the button by dragging it off the tool bar.

7. Repeat steps 4 through 6 for each macro that you created in step 1. When you have fully populated your Toolbar Manager tool bar, close the Customize dialog box, and—voilà—you've now got a tool bar that brings up tool bars.

Greg Lawhorn
Paso Robles, California

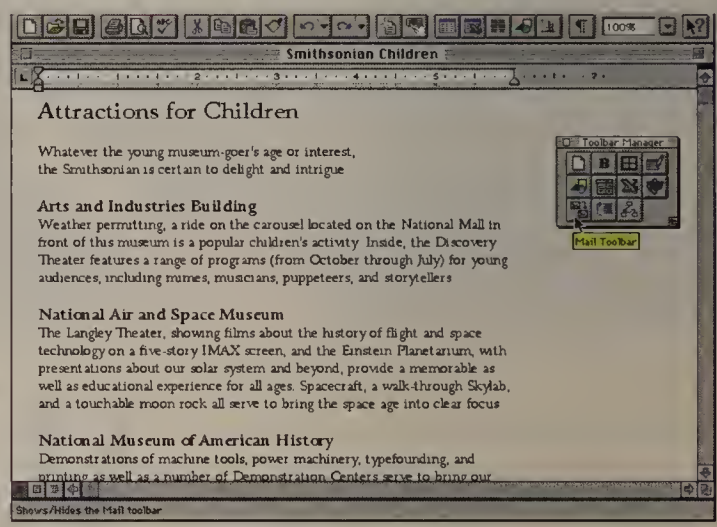
Rather than create a new tool bar, you could use another of Word 6's shortcut menus. Simply control-click anywhere in any tool bar to pop up a shortcut menu that lists nine common tool bars, with check marks next to the visible ones. Choosing a checked tool bar hides it, and choosing an unchecked tool bar shows it.

You can make the Toolbar Manager tool bar more useful by having each button alternate between showing and hiding a tool bar. This requires editing each macro as follows:

1. Choose Macros from the Tools menu to bring up the Macros dialog box. Select a macro you wish to edit, and click the Edit button. (Alternatively, you can create a new macro by typing a name and description and clicking the Create button.)
2. Enter the following macro text in the macro-editing window, replacing *Standard* with the name of the appropriate tool bar:

```
Sub MAIN
Toolbar$ = "Standard"
ViewToolbars .ColorButtons = 1, .LargeButtons
        = 0, .ToolTips = 1
If ToolbarState(Toolbar$) Then
        ViewToolbars .Toolbar = Toolbar$, .Hide
Else
        ViewToolbars .Toolbar = Toolbar$, .Show
EndIf
End Sub
```

3. Close the macro-editing window. Word asks if you want to save changes; click Yes.
4. Repeat steps 1 through 3 for all the tool bars you want to control from the Toolbar Manager tool bar. You can save considerable typing by selecting all the macro text and copying it before closing the first macro. In subsequent macros, paste the copied macro text and change the tool-bar name.
5. Create a new tool bar as described in steps 2 through 7 of the tip, using the macros you typed instead of recorded macros.—L.P.



Tool-Bar Tamer You can create a custom tool bar to manage Word 6's many other tool bars. Each button activates a Word macro that controls a different tool bar. Word displays the macro name near the pointer (as ToolTips text, a Word 6 alternative to balloon help) and displays the macro description in the status bar at the bottom of the screen.

Update on Power Mac Virtual Memory

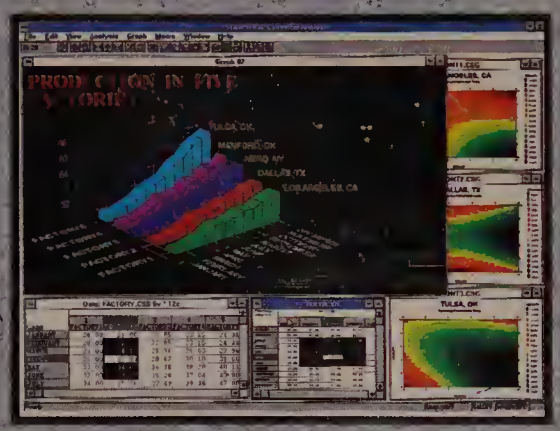
Instead of turning on System 7's virtual memory to reduce the amount of RAM required by native Power Mac applications (as described in a December tip), you can use Connectix RAM Doubler. Bill Waits of Norcross, Georgia, reports that the program uses less disk space and causes less slowdown than does virtual memory (even if you set virtual memory as low as possible). m

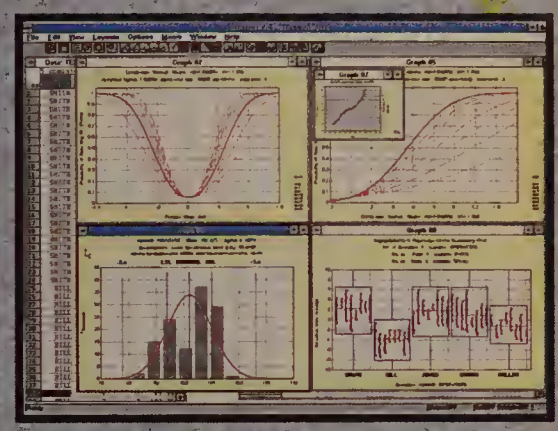
We pay from $25 to $100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

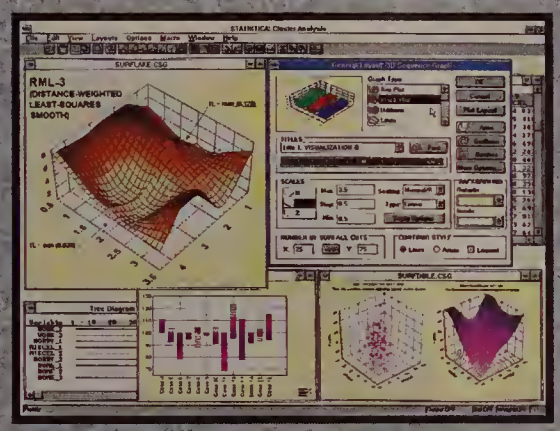
LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

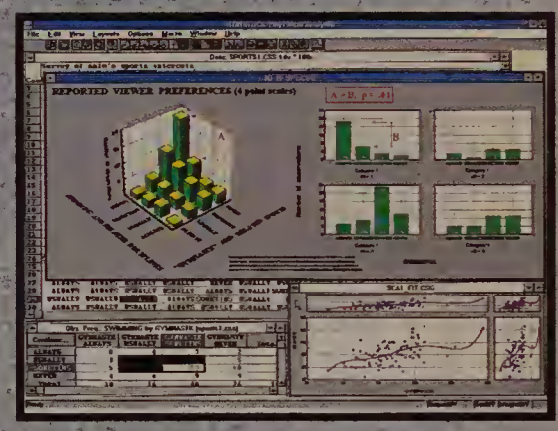
STATISTICA/w

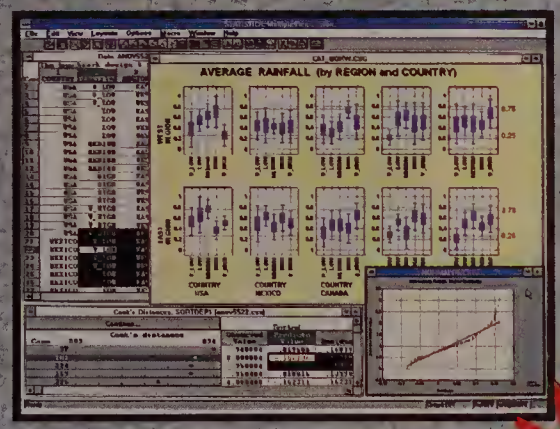
Windows, DOS, Macintosh

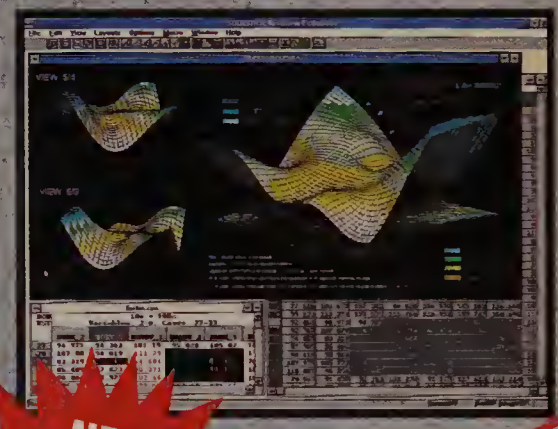


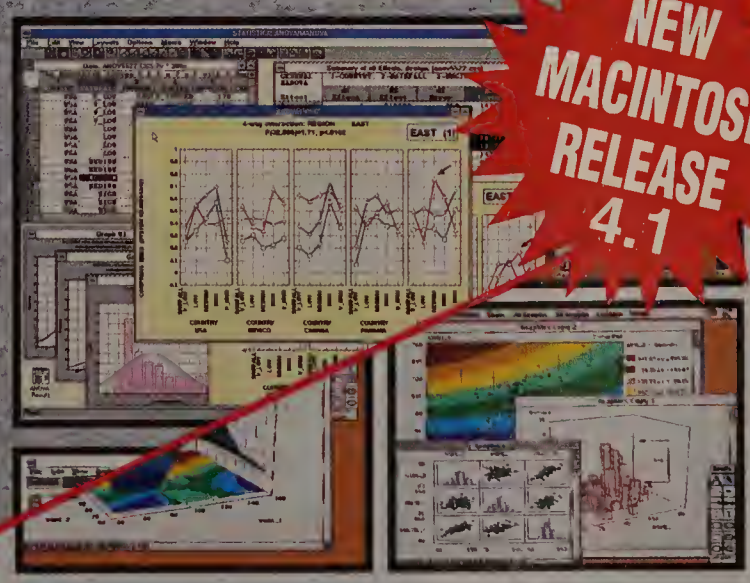




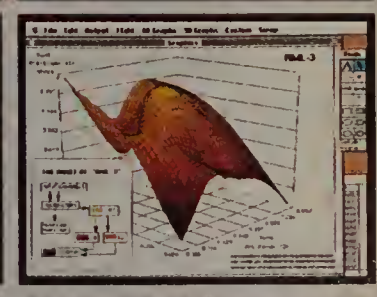


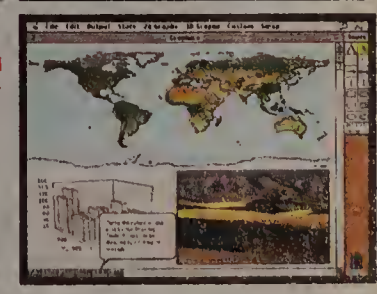






NEW MACINTOSH RELEASE 4.1





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EDITED BY ELIZABETH DOUGHERTY

Networks

THE LATEST IN CONNECTIVITY AND COMMUNICATIONS

Open Transport Moves Along

"IF YOU HAVE 20 DIFFERENT LIGHTBULB sizes, then you need 20 different sockets," quipped then U.S. Navy Commander Grace Murray Hopper in 1964, when proliferating programming languages threatened to swamp software developers. Hopper's words kicked off the invention of a programming language, called COBOL, to act as a "standard bulb" for software development. Thirty years later, programmers face a similar threat to software development—this time from a multitude of communications protocols, one problem that Apple hopes its new networking architecture, Open Transport, will help solve.

To create applications that work in multiple network environments, programmers must write custom code for each protocol, including AppleTalk, TCP/IP, SNA, X.25, DECnet, IPX, and OSI. Multiply these protocols by several different program-interface standards—from Unix, X/Open, and POSIX groups—and you have some idea of the confusion impeding network-software development. Apple's solution, Open Transport, takes a different tack from Hopper's COBOL. Instead of a single standard lightbulb, Apple has invented a 20-socketed lamp.

The problem Apple must solve differs from the 1960s programming-language crisis in that Open Transport must coexist with, not replace, existing standards. Open Transport intends to accomplish this by putting a consistent face on programming and user interfaces, so that software developers can write applications—and end users can manage their networks—without worrying about the underlying protocols. On the network side of these interfaces, users can plug in any or all of the already mentioned transport protocols. What's more, users can change these protocols on the fly, without rebooting systems or even quitting applications. Apple calls this concept transport transparency, and it lies at the heart of Open Transport.

The potential benefits of transport transparency are many: developers can write applications that automatically work with any protocol, network administrators can mix protocols on a network, users can manage heterogeneous networks consistently, and any Mac can route network traffic between protocols. Transport transparency includes the ability to centrally create client-system preference files and distribute them via file transfer or E-mail, eliminating on-site configuration.

Open Transport's user interface has three user-selectable access levels. The lowest, Basic/Novice, lets users change only a few essential configuration items. The Advanced/Expert level lets users access all configurable items. A password-protected Administrator level enables an administrator to lock any or all individual items at the two lower levels.

In addition to user-interface improvements, AppleTalk network managers will gain the ability to manually specify protocol addresses, dynamically unload AppleTalk to conserve memory, and remotely check AppleTalk version and configuration status. TCP/IP networks will benefit from support for the new DHCP (Dynamic Host Configuration Protocol) Internet standard, which provides centralized storage and distribution of IP addresses and various TCP configuration parameters. Other new TCP/IP capabilities include DNS (Dynamic Name Server) explicit search paths, RARP (Reverse Address Resolution Protocol), BootP (Bootstrap Protocol), and multiple-gateway support.

The new application-programming

interface, which developers must explicitly code for, complies with XTI (X/Open Transport Interface), POSIX, and XPG3 standards and includes extensions for object-oriented programming in C++. All new interfaces include native Power Macintosh implementations that take advantage of RISC speed improvements, boosting networking performance on PowerPC machines. Performance on 680X0-based Macintoshes is supposed to match current network throughput.

Apple expects to ship Open Transport as a stand-alone product in March 1995 and as part of Copland system software, when it ships later in the year. Alpha testing began in November 1994, with beta scheduled to be under way in January 1995. When Macs with PCI slots ship in the second quarter, they will include Open Transport networking. Apple has stated that it will move existing Mac networking products—such as Apple events, Apple Remote Access (ARA), PowerTalk, PowerShare, and AppleShare—to Open Transport quickly. In addition, Novell plans to develop IPX and NetWare Core Protocol services and protocols for Open Transport.—MEL BECKMAN

3Com Enhances Ethernet for Multimedia

ARE YOU THINKING ABOUT RUNNING multimedia applications on your network but getting confused by all the technologies—like Isochronous Ethernet, 100 VG-AnyLAN, and ATM—being touted for high-speed networking? Well, 3Com Corporation has developed yet another option: PACE, which stands for Priority Access Control Enabled.

PACE is a switching technology that beefs up an Ethernet network so it can more efficiently handle multimedia applications such as videoconferencing. It works by controlling latency and jitter, the two factors that cause delay in delivering audio and video traffic over Ethernet networks, and by implementing a class-of-service scheme that gives higher network priority to time-sensitive apps. (Users on traditional Ethernet networks often get jittery images or audio and video fade-outs when network traffic is heavy.)

PACE runs on an existing Ethernet infrastructure, so you don't have to change adapter cards or cable. But PACE requires Ethernet switching, which dedicates an Ethernet pipe to each user.

3Com said it will add PACE technology at 10 Mbps and 100 Mbps to its next generation of workgroup switching products sometime in 1995, for a price of roughly $150 per port. 3Com also plans to license the technology to other switch vendors.

Apple has announced support for PACE as an emerging network technology designed to facilitate multimedia use. Novell, Silicon Graphics, and Sun Microsystems are also backing it. 3Com, 408/764-5000.—MARTHA STRIZICH

Neon Updates LANsurveyor

NEON SOFTWARE'S APPLETALK-NETwork-mapping software, LANsurveyor 2.0, sports new layout features, a more flexible topology, and multiple levels of zoom. It also offers expanded search and reporting capabilities.

LANsurveyor generates maps that show the physical and logical relationships between AppleTalk devices; it also performs traffic monitoring. Network managers who troubleshoot communications problems will appreciate the ability to manually add IP objects to maps and ping them. You can also use the software to test possible configuration scenarios and their implications (for example, adding a router). Priced at $395 for a five-zone version or $695 for unlimited zones, LANsurveyor includes both native Power Mac and 680X0 versions. Neon Software, 510/ 283-9771.—MITZI WALTZ

CHRIS SPOLEN

IN BRIEF

■ **Tracking Devices** Network Reporter 1.1 ($429) from MR Mac Software scans an AppleTalk network at scheduled intervals; builds a database of device information; and generates up to 21 reports, such as changes in devices connected to the network that occurred during a week, based on this information. 619/453-2845.

■ **Internet In-house** For information about how offerings from Global Village, BBN Internet Services, and InterCon can help connect your company to the Internet, see "In-house Internet Servers" in *News*, elsewhere in this issue.

Two Compatible Routers

COMPATIBLE SYSTEMS' RISCROUTER 4000S ($3995) combines the performance advantages of a switch with the functionality of a router, offering a hybrid option that the company dubs a *switching router*.

Like a switch, the four-port 4000S (the *S* stands for switch) improves network performance by isolating workgroup traffic into four dedicated 10-Mbps segments. Like a router, the 4000S provides network-management capabilities, such as the ability to logically subdivide a network into subnets and to set AppleTalk names and security-access levels.

A second product, the RISCRouter 3400R ($2995), is a wide-area router designed for central sites with high-bandwidth needs. The five-port unit, which routes AppleTalk, TCP/IP, IPX, and DECnet traffic over PPP, has two T1 ports, two 128-Kbps ports, and one Ethernet port. Compatible Systems plans to ship the 4000S and the 3400R by March 1995.

Compatible is incorporating support for frame relay into the 3400R and its other wide-area routers, the MicroRouter 900i and the MicroRouter 1000R, starting in January 1995. Existing 900i and 1000R users can get frame-relay upgrades free via the Internet, AppleLink, CompuServe, or Compatible Systems' bulletin board or ARA server. Compatible Systems, 303/444-9532.—MARTHA STRIZICH

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BY CARY LU

PowerBook Notes

Is Your Battery Safe?

IN NOVEMBER 1994, TECHNÖGGIN (513/321-1777) announced that it had stopped selling external PowerPlate batteries for the PowerBook and recommended that all of its users stop using the batteries. The company cited problems with acid leaking from the lead-acid cells inside the batteries. Technöggin's nickel-cadmium internal PowerBook battery and QuickTake 100 camera battery are not affected.

What Actually Happened

All batteries contain chemicals that react to produce electricity. In a lead-acid cell, hydrogen-gas buildup is a normal part of the charging process, so all cells include a pressure valve to exhaust the gas if necessary. The valve may not be readily visible (in an alkaline flashlight battery, the valve is part of the case seal). The pressure increase must be carefully handled by the cell design and the charging circuit. If the pressure is high enough, some battery chemicals may come out of the valve in addition to gas.

In some failed Technöggin batteries, dilute sulfuric acid—the standard electrolyte in lead-acid cells—and chemical residues came out of the valves. A small amount of acid will most likely be contained within the battery case and go unnoticed; larger amounts could leak out and potentially damage anything nearby. (If acid gets on your skin, flush the affected area with lots of running water; be very careful not to get acid in your eyes accidentally—don't rub your eyes!) Several Technöggin batteries leaked enough acid to eat holes through a carrying case.

An acid leak is bad enough, but the PowerPlate Mini 3 can suffer a worse fate because of its unfortunate circuit layout. The leaked acid and chemicals can

short a cell, making it very hot—hot enough, reports Technöggin, that some batteries melted holes in the battery case.

Technöggin says that of the 7435 PowerPlate batteries it shipped through June 1994, 83 were returned with leaking cells, a failure rate of 1.1 percent. Most of the leaks occurred after the batteries had been used for at least 6 months. Of the 401 batteries that were in the field for more than 12 months, 16 failed—a very high 4 percent failure rate. Of the PowerPlate models, the Mini 3 failed more frequently than the 3X and 5X. In about half the cases, the customer noticed no leakage and returned the battery for other reasons; Technöggin saw the leakage during service work.

All of the information about cell-failure rates given here comes from the companies. Most companies quote a cell-failure rate that includes but isn't necessarily limited to leakage. The companies see only returned batteries; a battery that tests good will not normally be opened up to inspect for leakage, so all of the failure rates are subject to some uncertainty.

The Cell Maker

Technöggin got cells for its flat-pack batteries from Portable Energy Products (PEP), a company founded in 1992 to build a novel, flat lead-acid cell. To make a PowerBook battery, Technöggin took three or six PEP cells and installed them in a case with a charging circuit. The flat cells make for a thin battery that can be carried conveniently underneath a laptop computer. Although Technöggin's main competitor VST Power Systems (508/287-4600) previously used PEP cells, VST says it has been phasing them out since November 1994 and will be completely switched over to a different supplier by January 1995.

VST and PEP have both reported a far lower failure rate than Technöggin. VST says that for its PEP-based batteries, the failure rate due to faulty cells is about 0.1 percent. This matches a 0.04 percent cell-failure rate quoted by PEP (since a battery contains three to six cells, only one of which is likely to be defective, the cell-failure rate will be lower than the battery-failure rate). Based on its experience, VST believes that its batteries are safe to use and is continuing to manufacture and sell them. PEP says that improving manufacturing processes over time reduced its failure rate and that it had experienced no cell leakage with cells made since May 1994. However, by early December 1994, PEP had stopped producing cells.

Although VST and Technöggin used the same cell maker, their batteries differ

continues

PHOTO BY MARK JOHANN, SCREEN IMAGE BY GARRY GAY/IMAGE BANK

in many ways. The two companies used different test procedures and assembly processes as well as different charging circuits. Any or all of these differences could account for some or all of the differences in failure rates.

The two companies do agree on one thing: PEP cells suffer from poor quality control in mechanical construction and electrical performance. Technöggin and VST ran multiple screening tests to check for manufacturing defects and to match cell capacities; both companies report having to reject many batches of cells from PEP.

PEP has had difficulty selling its cells in quantity to other computer companies. In 1993, IBM introduced its ThinkPad 500 laptop computer with a custom PEP battery. Amid many reports of short battery life, IBM withdrew the computer. Eventually IBM brought out a new version of the ThinkPad with a nickel–metal-hydride battery instead of PEP cells. (No one has successfully marketed external batteries for DOS/Windows laptops because of the wild proliferation of battery types. The more than 1 million 100-series PowerBook laptops, by contrast, can all use the same external battery.) PEP also tried to get Apple to adopt PEP cells for PowerBooks, but "we were never very favorably impressed with PEP cells," says a senior Apple battery engineer.

In 1993, the large Korean company Hyundai licensed the PEP technology with the intent of becoming a second source for the PEP-style flat cells. Hyundai began production in the fall of 1994. Battery vendors report that Hyundai's cells show far better consistency and repeatable performance than PEP cells. Hyundai has told its customers that it plans to make several changes to the cell design, including taking steps to reduce the potential leakage problem.

Other Battery Sellers

Lind Electronic Design (612/927-6303, 800/659-5956) has been selling batteries since 1984, beginning with a battery pack for the Apple IIc. Lind had looked at PEP cells but decided not to use them because of concerns about manufacturing and quality-control problems. Lind sells an external battery pack for PowerBooks that is bulkier than the PEP-based batteries. On the other hand, Lind reports that in a decade of building lead-acid batteries with cells from three established Japanese manufacturers—Panasonic, Yuasa, and GS Battery (Japan Storage)—it has not seen a single case of acid leakage. Lind points out that for the established battery companies, significant cell leakage is so rare that few people can recall any cases. Lind says it has never had to reject cells for manufacturing or performance flaws.

The fourth supplier of external flat-pack batteries, Battery Technology Inc. (BTI; 213/728-7874, 800/982-8284), uses a liquid-electrolyte lead-acid cell made by Shin-Kobe Electric Machinery in Japan, a Hitachi division. BTI claims a cell-defect rate of 0.1 percent and has no reports of leakage. BTI also says it has never had to reject cells from Shin-Kobe.

Is Any Battery Safe?

I think that a 1 percent leakage rate is too high for a product that will be carried by hand for long periods of time. If you have a Technöggin PowerPlate battery, the prudent choice would be to stop using it. If you must, consider using it only in stationary situations where acid leakage would cause no serious damage. Although Technöggin says it lacks the funds to recall its batteries, several vendors, including APS and MacZone, say they will refund to their customers the purchase price of Technöggin batteries.

The other battery vendors say their products are generally safe. I haven't heard any information to the contrary.

Yet all batteries store energy and thus have some inherent degree of instability. You must treat batteries with respect, just as you would an AC power source or a tankful of gasoline. If you drop a battery, inspect it carefully for signs of physical damage; if you suspect any damage, don't use the battery until it has been checked. Always take care to avoid shorting battery terminals. Protect the battery from very hot temperatures (don't keep it inside a car on a sunny day, for example). Use only the appropriate power adapter or charging device for your battery. Charge your PowerBook batteries on a table or other flat surface; don't leave a PowerBook or battery on your bed. Don't keep a PowerBook plugged in when you go away for a vacation. Read the manual carefully for information about battery care and charging. Send in the battery's registration form so the maker can notify you in case of a safety problem. When your battery can no longer hold a charge, dispose of it carefully by sending it back to the manufacturer. Many batteries contain heavy metals that should not go into landfills. m

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column. You can reach him at carylu@eworld.com.

MANAGING POWERBOOK 500 BATTERIES

The nickel–metal-hydride batteries for the PowerBook 500 have not suffered from anything like the turmoil of the flat-pack lead-acid cells, but some users have reported that these batteries do have their own problems: (1) the Control Strip fails to recognize an inserted battery; (2) the Control Strip recognizes a battery but the battery does not charge; (3) when the PowerBook is asleep, a fully charged battery dies in a day or two; (4) the battery overheats.

These problems can be fixed by adjusting the parameters stored in the battery's RAM. EMMpathy from VST, Battery Utilities 500 from Lind, and a new utility from Apple all address these problems.

Both Lind and VST have external battery chargers for PowerBook 500 batteries. The VST SmartCharger 500 ($179.95) is similar to Apple's chargers for older PowerBooks: a rectangular box with slots for charging two batteries simultaneously, using the PowerBook's AC adapter. For an additional $80, VST includes Apple's PowerBook 500 AC adapter so you can charge batteries while using your original AC adapter to operate the PowerBook.

The LindPowerCenter 500 ($249.95) looks and acts quite differently. The wedge-shaped Lind charger takes two batteries—one in each end—and can act as an external battery pack as well as a charger, so you can run sequentially through four batteries (two in the PowerBook, two in the Power Center). You need only one AC adapter to charge batteries and operate the PowerBook simultaneously. As a result, however, the Lind can charge only one battery at a time; it takes three hours to charge two batteries, compared with one and a half hours for the VST.

The small Lind Single Charger 500 ($79.95) will charge a single PowerBook 500 battery; it requires a PowerBook 500 AC adapter.

If you have two batteries, you don't need a charger; if you have three, the small Lind charger can help out, although you can probably live without a charger. If you have four batteries, the Lind PowerCenter 500 gives you more options. If you have more than four batteries—or manage multiple PowerBooks—the faster-charging VST makes sense.

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THE DESKTOP CRITIC

BY DAVID POGUE

Macroworld

Macros put the function back in function keys

REMEMBER THAT SHOCKING 1986 report? It found that people were *less* productive with personal computers than without them. According to Dr. Gary Loveman, then of MIT's Sloan School of Management, by the time you've finished shooting your troubles, tweaking your screen savers, and finessing your printout, you've spent more time than you would have pounding away on the old IBM Selectric.

How could they arrive at such a finding? Surprise, surprise: they were studying DOS computers, not Macs. Furthermore, I'll bet the test subjects weren't using macros.

A macro makes something happen automatically when you press a keystroke. Typing your return address. Turning up the sound. Launching your address-book program. A macro program gives purpose in life to those otherwise superfluous keys on the extended keyboard—F1, F2, F3, control, page up, and the like.

Macros are even more essential if your daily duties include longer sequences of steps: launch America Online, type password, save mail, print it. Reformat 150 names from "[First Name, Last Name]" to "[Last Name, First Name]." Let a macro program do just one of those jobs for you, and it's almost paid for itself.

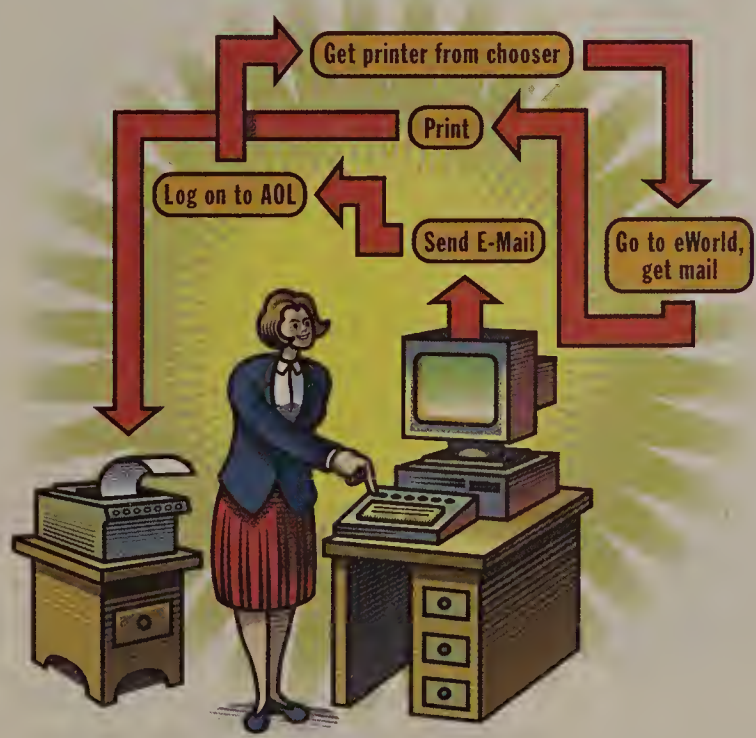
QuicKeys 3.0.1

QuicKeys ($119; CE Software, 515/221-1801) lets you create macros the lazy way: with a watch-me mode, wherein whatever you do manually, QuicKeys records. Thereafter, whenever you press the trigger keystroke of your choice, QuicKeys reenacts your steps. Fast. Watching a macro play back is a startling experience: menus flash down, the cursor zips furiously hither and yon, windows open and close as though a caffeine-crazed ghost has seized control of your machine.

Unfortunately, macros recorded using that watch-me business (whether it's QuicKeys or another program) play back correctly only about half the time. Simple ones, like typing, clicking a button, or pulling down a menu, are pieces of cake. The rest derail on playback. Maybe circumstances have changed since you made your recording—an icon isn't in the same place. Or maybe QuicKeys didn't understand what you were trying to accomplish, and replays your steps to the letter, but not the spirit, of your intention.

To debug your recorded watch-me macros, you open an editing window. Its tools help you perfect what you recorded. For example, you may have to insert a pause between two of the steps.

The highlight of QuicKeys' editing window is its canned macros, listed in submenus of submenus. They include changing your monitor's color setting; shutting down; bringing forward the next window; typing today's date; and switching a selected printer without even opening the Chooser. If the idea of programming macros makes you nervous, you can live a long, happy, and productive life using only these ready-made ones.



Version 3's annoying habit of littering your watch-me macros with Pause commands only adds to QuicKeys' reputation for being slower than other macro programs. But those pauses do enhance QuicKeys' accuracy in reproducing your actions, and you can always take out the ones you don't want.

In ease-of-use terms, QuicKeys is no TeachText. You have to experiment for about half an hour before you really get it—no thanks to the example-scarce manual, where the landslide of made-up terminology makes your eyes glaze over. ("The commands in the Sequence Editor work on the steps in a sequence instead of shortcuts in a set." *Riiiiight.*)

Even so, QuicKeys is unquestionably the user-friendliest macro program. (Apple's own MacroMaker doesn't count. It was fine in its day, but it crashes System 7-point-anything.) After training QuicKeys to do your bidding at the touch of an F-key, you, like thousands before you, won't be able to imagine a life without it.

Tempo II Plus 3.0.9

On paper, Tempo ($179.95; Affinity Microsystems, 303/442-4840) sounds a lot like QuicKeys: you start recording, do your thing, stop recording, and specify a trigger key. Your macro is ready, sir/madam.

But the user-interface police should be all over this baby. Tempo's rigid chains of dialog boxes make you feel straitjacketed when editing macros. Every time you edit a macro, you have to click on a Save button, which is really a Save As button, so you're asked: "Are you sure you want to replace . . . ?," which means you have to click on *another* button. Which is a very silly design. And while I'm venting, Tempo won't accept individual letter keys as triggers. In QuicKeys, by contrast, you can, in an emergency, make the \ key type a *P* when your actual *P* key stops working.

But Tempo is smart. Darned smart. Not only can it make decisions by reading words in a document, it can even analyze the picture on the screen. Example: CE Software's phone staff and I were unable to create a QuicKey that would dial with Apple Remote Access, wait for a connection, and then open QuickMail.

continues

PETER HOEY

But Tempo, by waiting until the words *Connection Established* appeared on the screen, handled the task with aplomb.

Tempo can also perform the essential act of *batch processing*—applying a certain formatting or data-massaging step to every single file in a folder, one after another. True, nonprogrammers will have to call Affinity's toll-free help line to get it set up. But batch processing is an incredibly useful tool for Photoshop jocks, FileMaker pros, or the E-mail deluged.

There's no use putting up with Tempo's spartan interface if you just want to make F1 empty the Trash and F2 launch ClarisWorks. But if your work involves any kind of repetitive data processing, Tempo is a tireless, industrial-strength drone with a passion for drudge work.

TempoEZ 1.2a

This program is precisely identical to Tempo II Plus, except that it lacks a few of the more sophisticated smarts. You can't do batch processing, assign macros to fire at certain times, or use Externals (plug-in extra features).

If Tempo II Plus's greatest sales point is its programmable brains, why buy a version without them? Cost. TempoEZ gives you all of those simpler macros (typing things, launching programs, getting your E-mail at midnight, zooming windows, and so on) for $79.95 from Affinity Microsystems (which means $49 by mail order).

KeyQuencer 1.2.1

Imagine a program that requires only one-third the RAM of QuicKeys, does its business much faster, and costs exactly $10. I'm pleased to introduce the surprisingly polished, cleverly named KeyQuencer.

Several dozen ready-to-play macros make this shareware control panel instantly valuable. One keystroke flips your monitor to a different color setting. Another lets you take a screen shot (a captured PICT file) of anything you rope off with the selection rectangle. Others do things like type the date, move a window, adjust the speaker volume, or switch to the next open program. The copy of KeyQuencer I've posted in the *Macworld* forum of America Online and eWorld also has canned macros that empty the Trash, jump to the Finder, put quotes around selected text, open the Calculator, find a lost PowerBook cursor, and so on.

Now the tough news: KeyQuencer has no watch-me mode. I'll wait while you digest that disappointment.

In other words, you must build every KeyQuencer macro manually—yes, program it—by typing a coded command. To make a macro that chooses Palatino from the Font menu, you type **Menu "Font" "Item Palatino"**. To make KeyQuencer type your name, you create the command **Type "Harold H. Higgens III, Esq."** (or whatever).

This is all made much simpler by the control panel's scrolling list of programmery verbs (Type, Menu, Click, Drag, and so on); you don't have to remember what order the words go in, what their spellings are, or even what they do (an explanation appears when you click in the verb list).

By way of instructions, you get only online help and three OK tutorials written by various fans of the program. But KeyQuencer is growing up fast. Each release offers more features; a real manual is supposed to be included by the time you read this. Today's KeyQuencer, unlike its rivals, doesn't let you create a separate set of macros for each program; future versions probably will (says the programmer, Alessandro Levi Montalcini).

The Upshot

If you're a raving fan of AppleScript or UserLand Frontier, don't get your hackles up. Those are scripting languages, not macro software. They're wonderful, but they cost much more than macro programs, gulp down enormous gobs of memory, and—more to the point—they're for programmers only.

Which leaves QuicKeys, Tempo & son, and KeyQuencer. Do you need one? Watch yourself for the next couple of days. Whenever you catch yourself duplicating your own efforts—typing your return address, applying the same size reduction to every QuarkXPress graphic, switching off the graphics grid every time you launch ClarisWorks—think macro.

Wanna know the real irony? If those personal computer researchers had used macros, they could have conducted their productivity study in half the time. **m**

Contributing editor DAVID POGUE is the coauthor of *Macworld Mac & Power Mac Secrets*, second edition (IDG Books Worldwide, 1994). He will soon be installing a fourth row of F-keys to accommodate his macros.

Macro Possibilities

Every macro program opens a world of time-saving possibilities. But not every program can handle every task. This table shows only some of the macros you can program—and points out the strengths and weaknesses of the top four contenders. (QK is QuicKeys, TM is Tempo II Plus, EZ is TempoEZ, and KQ is KeyQuencer.) And by the way, it's fine to run all of these programs together. If there's a conflict of keystroke, the extension that loaded first plays its macro.

	QK	TM	EZ	KQ
Switch printers without opening the Chooser	●	○	○	●
Launch a program	●	●	●	●
Open a certain folder (in the Finder)	●	○	○	●
Open a certain folder (in Save or Open boxes)	●	●	●	○
Glossary function (paste predefined text or graphic)	●	●	●	○
Zoom a window to full size	●	●	●	●
Turn File Sharing on or off without opening control panel	●	○	○	●
Open each file in a folder, reformat, save, go on	● *	●	○	● **
Quit all programs at once	○	●	○	●
Flash the current date or time	○	●	○	●
Draw a smiley face (real-time mousing)	●	●	●	○
Make your own message appear in a window	●	●	●	●
Empty the Trash Can	●	●	●	●
Trigger Apple events	●	●	○	●
Dial a phone number highlighted anywhere	●	●	○	●
Copy a specified file to a specified place	○	●	○	○
Switch monitor colors without opening control panel	●	○	○	●
Create double-clickable macro desktop icons	●	●	●	○
Switch to next open program	●	○	○	●
Switch to next window in same program	●	●	●	●
Wait for a certain window to appear, then go on	●	●	○	●
Check for presence of a button or menu item	●	●	○	○
Analyze Clipboard text before proceeding	●	○	○	○
Analyze selected text before proceeding	○	●	○	○
Analyze on-screen image before proceeding	○	●	○	○
Perform a macro at start-up or shutdown	●	●	●	○
Perform a macro at a specified time	●	●	○	○
Make screen saver turn on instantly	○	●	●	●

● = *yes;* ○ = *no.* * *Requires Apple-events programming or Super Boomerang.* ** *You must stop the macro manually once all files are opened.*

THE ICONOCLAST

BY STEVEN LEVY

Six Education

A dirty Word from Microsoft

THE COMING OF MICROSOFT Word 6.0 was not unheralded. For months my beleaguered mail carrier had been dragging in various tomes on its use, encyclopedia-size beasts published by Microsoft Press. One alone, the Cobb Group's *Word 6 Companion*, clocked in at 966 pages. Apparently Microsoft's publishing arm perceived a land-office business in selling texts and guidebooks to those who found the Microsoft-written manuals inadequate.

When the software finally arrived—I got my Word 6 as part of a package containing the entire Microsoft Office suite, another reason for my mail carrier to hate me—I found out why so many trees had to die. There are no fewer than 30—30!—floppy disks included in Office. I stacked them into a tower, a plaintive object of fin de siècle art. It represented a gravity-sucking black hole into which the best years of the lives of countless Micro-serfs had gone. And in the case of Word 6, it is work performed in vain.

Big Words

Of all the applications in Office, Word 6 stands ascendant. Word is the closest thing to a standard since the original MacWrite bit the big one—its continued evolution is of vital interest to all Macintosh users. And the trend has been alarming. While each iteration of Word has offered more features—some of them essential, others hopelessly obscure—the program gets bigger and bigger. And the performance leaves more and more to be desired. Now, with Word 6, we have the *War and Peace* of software, the Joyce Carol Oates of apps.

Word 6.0 takes up more space on the hard disk than a thousand *Moby-Dick*s. It begs for a memory upgrade (it's no coincidence that my copy of Office came with a free copy of RAM Doubler). Simply loading Office on my machine was a herculean task. First I had to ruthlessly clear off disk space—Word alone requires almost 25MB. Then I began feeding floppies to the Mac. To ease my wait, Microsoft provided little mini commercials that popped up on my screen as I loaded Office, kind of like billboards flashing by on a long highway drive: South of the Border, 200 miles away. Finally, the installation was complete. I double-clicked on the icon for Word 6. And waited.

After a near eternity, Word appeared on my screen. And all of a sudden, my monitor looked like Times Square. What seemed like hundreds of little buttons lined up, and a little-bitty area for text entry peeked through. There were buttons for everything (fortunately for those of us who are not mnemonicians, the program has a feature that instantly decodes the arcane symbols on the buttons), from Insert Excel Spreadsheet to Bullets. This seemed strange to me—why would I want to yield valuable screen real estate to functions I seldom need (Insert Chart) or functions I perform so often (Cut) that I use keystroke commands for them without a second thought? Anyway, shouldn't commands, in general, stay where they belong—under the pull-down menus?

JOHN RITTER

Stop Time

I plunged forward to use Word 6 and, to my surprise, found it to be one of the most remarkable computer applications I have ever seen. Though I have not spent enough time with it to fully understand its intricacies—a feat that I have about as much chance of completing as an Everest climb—I am truly impressed with the clever innovations that the Microsofties have devised.

I am thinking of Wizards, a no-brainer means of formatting certain types of documents; the spike, an ingenious way of extracting information from a number of files into a single new file; and, at long last, a table that's as easy to set up as a spreadsheet. And I have even come to love the autocorrect aspect of Word, which silently fixes typos but leaves alone unfamiliar proper nouns and strange words of my own invention. Indeed, I could fill up several months' worth of columns describing neat aspects of Word 6 (including the customizable nature of the screen, so that you can eliminate those noisome buttons). But instead, to my regret, my verdict on this massive project is a big negative.

The problem is, Word 6 runs so poorly that it is virtually unusable.

For February *News* my colleagues at *Macworld* subjected Word 6 to a stopwatch and discovered some hideous failings. Generally, version 6 took twice as long to complete various commands as did the previous version—in some cases, much longer: loading Word 6 on a Centris 610 took more than seven minutes, over three times as long as loading Word 5.1.

But I didn't need Macworld Lab to tell me that Word 6 performs like a sick old dog compared with Word 5.1, or even with Word 4 (which I still use on my PowerBook because—get this—I think 5.1 is too big). I felt the difference. Every time I opened the application. Every time I saved. Every time I pulled down a command from the menu bar. It was as if I were living inside an old QuickTime video—movements fluid in the real world became jerky and disconnected. Simply doing a word count in 6.0 gave me time

continues

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to wash my hair before Word finished tallying up the words in a file.

To avoid the infuriating pauses of Word 6, it didn't take too long before I actually began modifying my work habits, such as saving less often. Or not checking out things I had written earlier in a document, to avoid scrolling. In accommodating my work habits to the flaws of Word 6, I was becoming a less productive worker.

Earth to Microsoft: upgrade means improvement. The wealth of new features and spiffier components in Word 6 doesn't mitigate the fact that this version is harder to learn, more difficult to manage, and much less pleasant to use than its predecessors. Quite simply, Word 6 fails to meet minimum standards of performance. It's as if a car company went bonkers with moon roofs and audio systems but produced a car whose top speed was 45 miles an hour.

Rotten to the Core

How can it be? How does Microsoft, a company renowned as the great success story in American business, screw up so badly?

I think I learned at least part of the answer by reading a Microsoft strategic white paper called *Beyond Platforms*. The premise of this document is that Microsoft's new applications are designed to be virtually identical no matter what computer they run on. At the heart of these applications is a core code shared by all platforms, including Macintosh, Power Mac, Windows, and Windows NT.

Though Microsoft does fine-tuning on the Macintosh to utilize the Mac's abilities, the essence of the system—what makes Word 6 what it is—is this core code. As justification for this approach, Microsoft cites a *MacWeek* study that claims that two-thirds of Macintosh managers require software that can read and write the same file formats on different platforms. Of this group, 76 percent said they required interoperable software.

That may be what Macintosh managers ask for—and anyway, almost all major Mac applications accept file formats from the Windows world anyway—but when it comes to users, the priorities are different. We simply want the best software, and as a minimum we want software that performs at a decent clip. This business with the core code written for all platforms and not constructed as a ground-up Macintosh program seems to guarantee that the software will run less efficiently on our computers. Macs.

And for what? While it is nice to have apps that are interoperable with Windows software, we have specifically chosen Macintosh software for a reason—it is better. Therefore, I'm offended at the explanation that the cluttered, trashy look of Word 6 is due to the requirement that Macintosh Word must appear identical to the Windows version. Who wants that? The Macintosh OS is better than Windows. Why should we settle for the lowest common denominator—particularly when we wind up paying a double price, in performance and interface design?

To me, the key sentence in the white paper is this: "Microsoft Office for the Macintosh provides virtually seamless compatibility with Microsoft Office for Windows, helping the Macintosh to be a good corporate citizen." Apparently, the superiority of the Macintosh system is a subversive obstacle to Microsoft's goal of standardizing the business world around the Windows model. By being better, Mac applications are downright disruptive—bad citizens! Microsoft's solution? Make Macintosh apps look and feel the same as Windows apps. And what if, in the process, the performance decays so badly that Word 6 is hardly usable? We know Microsoft's answer—release it! If Macintosh users want to be "good citizens," they'll swallow the pill.

Not me, babe. Until and unless Microsoft addresses the performance problems of Word, I'm out of here. I've been experimenting with two alternatives recently—Nisus Writer and Akimbo Systems' FullWrite 2. Nisus seems to offer almost all of the features found in Word, with a simpler interface. Its scripting and searching abilities may even eclipse those of Word. FullWrite is wonderfully compact—it takes up less than 800K on a hard disk—and is particularly nimble in outlining and simple page-layout tasks. One of these two is likely to become my everyday word processor. (For more on this topic, see the features by Robert C. Eckhardt and David Pogue in this issue.)

It's not without some regret that I leave the Word world, especially when it means missing out on some of the truly wonderful innovations of Word 6. But judging from the snooty tone of Microsoft's white paper, the regret is mostly on my side. At some point about 10 million of us Macintosh users made a decision to go with the best, not the standard. We've expected industry leaders like Microsoft to accommodate us with excellence. Instead we got Word 6, with its implicit message to Macintosh loyalists: Drop dead. **m**

STEVEN LEVY's latest book is *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything* (Viking, 1994). Levy is a fellow of the Freedom Forum Media Studies Center in New York.

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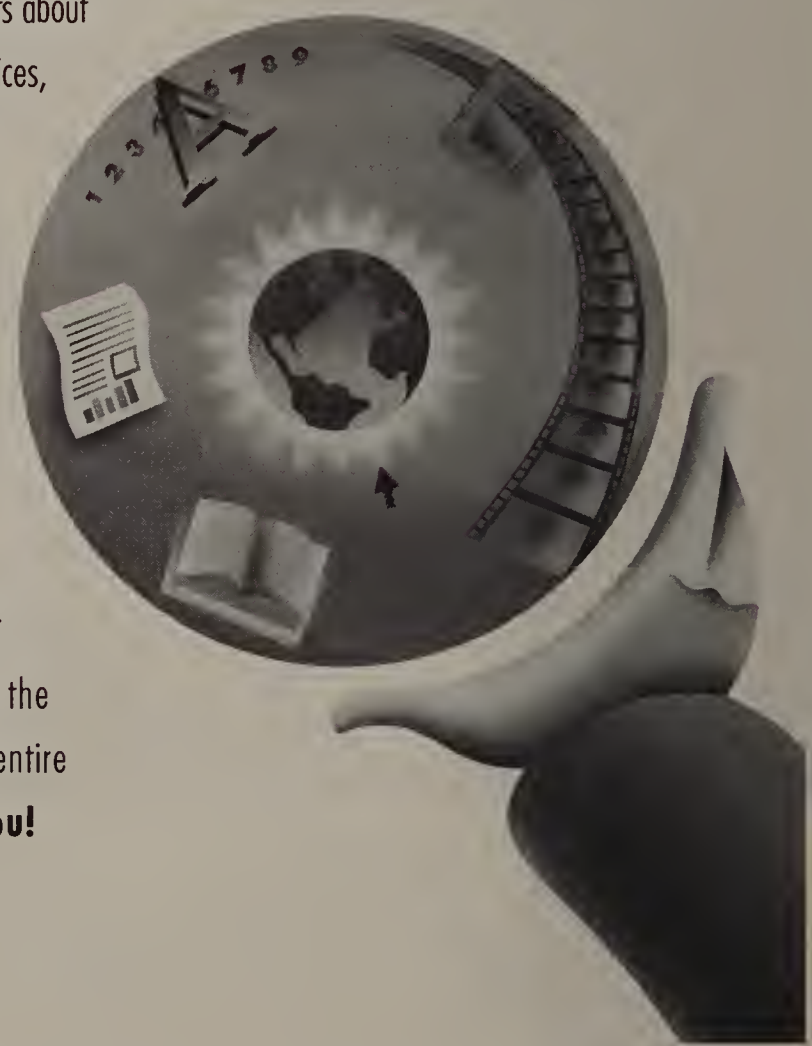

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CONSPICUOUS CONSUMER

BY DEBORAH BRANSCUM

A Primer on Prices

Why published prices don't always match retailers'

"YOU CAN ALWAYS FIND SOMEbody selling much lower than suggested retail price," says John A. Murphy, editor and publisher of *The PC Street Price Index* (609/784-8866), which tracks the lowest advertised prices for personal-computer hardware and software. "Suggested retail doesn't mean anything." A lot of companies agree: Microsoft, Apple, Adobe, NEC, and DayStar Digital are among the firms that have eliminated suggested retail prices (SRPs) altogether. It's probably just as well: as Murphy points out, SRPs and list prices usually aren't a realistic reflection of product prices.

In announcing its decision to drop SRPs last May, Microsoft said its research showed that "price-conscious customers simply ignore SRPs and look at the prices advertised." So Microsoft dropped list prices and no longer provides a price list for its products. Instead, when introducing a product, the company publishes what it calls an estimated retail price. A street price, in other words.

Pushing this trend is the industry recognition that SRPs aren't accurate because retailers, not manufacturers, set retail prices. And retailers price products based on the cost of the goods from the manufacturer or distributor—not based on SRPs publicized by manufacturers. Prices equal "the cost of goods plus sales and transaction costs and hopefully a modest profit," according to Peter Godfrey, president of MacWarehouse.

In theory, the industry trend toward estimated street prices means that the prices the companies give *Macworld* for publication are more realistic overall. But as a nationwide survey shows, estimated street prices may not be the final word on what you have to pay for any given product on any given day (see the chart "Your Price May Vary").

Last September, for example, Intuit moved from using SRPs to estimated street prices. As I write this, Quicken 5.0 has an estimated street price of $39.95, implying that consumers need to spend $39.95 to get the application. As a reality check, I called a variety of retailers and catalog firms and found Quicken selling at $35, $43, and $45 depending on the place of purchase. Even more surprising was my discovery that Intuit sells Quicken directly to consumers for $49.95—$10 *over* the estimated street price.

Prices for major applications remain fairly consistent, regardless of place of purchase. I found that major retail chains and the top three mail-order companies tend to sell popular applications for very similar prices. That shouldn't be surprising, according to MacWarehouse's Godfrey. "Taken as a whole," he says, "there should not be a significant difference in prices between CompUSA and catalogers," except in the case of special promotions that retailers sometimes use to bring in additional customers.

JOHN RITTER

Mel Badgett agrees. According to Badgett, the director of graphics applications for Claris Corporation, "It's a very efficient market for the top 50 to 75 applications." Consumers should see minimal price differences among the top-selling products, he says, but they may find substantial price disparities among low-volume products, such as CAD packages.

But even best-seller ClarisWorks 3.0 was being sold for a wide range of prices when I checked recently. The lowest price, $70, reflected a discount for buying the package with a Macintosh system. The highest price matched the SRP of $129; several places sold it for $99.

Even so, software prices are generally more consistent and stable than hardware prices, which tend to go down over time as companies develop and introduce new products. As manufacturers wrestle with how to determine and publicize realistic prices, it's a challenge for consumers to determine what's a bargain.

Apple's Strategy

Take Apple, for example. About 15 months ago the company stopped using suggested retail prices for its products; in fact, Apple no longer publishes a price list of any sort for consumers. Instead, as products are announced Apple provides journalists with its so-called ApplePrices. You might surmise that the ApplePrice represents an estimated street price. But you would be wrong.

"ApplePrice is the price [at which] Apple intends to sell its products to customers who are purchasing as few as one unit through a direct Apple sales program," explains Apple spokesperson Jayme Curtis. "The leap in logic is that we don't sell direct. . . . The ApplePrice is the price we use for announcing our products, but it's not an indicator of street price."

Hmm. So what *is* it an indicator of? "The ApplePrice is a way for us to communicate the value of our product without using a price, because that's out of our hands," says Curtis. "When we talk about the ApplePrice, we're not talking about the actual price, we're talking about value. . . . The ApplePrice is a way of letting people know they can buy a Macintosh for about the same price as a Windows machine without setting an actual price, because we don't set prices."

continues

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Your Price May Vary

Selected Product	Company's Price	Street-Price Range
Software		
ClarisWorks 3.0	$129 suggested retail price	$70–$129
FileMaker Pro 2.1 for Macintosh	$99 special promotion price	$90–$99
Quicken 5.0 for Macintosh	$40 estimated street price	$35–$45
Microsoft Word 6.0 for Macintosh	$339 estimated street price	$295–$340
Norton Utilities 3.1 for Macintosh	$129 suggested retail price	$93–$100
System 7.5	$135 ApplePrice	$84–$100
Hardware and Peripherals		
NEC MultiSync 5FGe 17-inch monitor*	$1045 estimated street price	$975–$1149
Power Macintosh 6100/60 8/250/CD	$2289 ApplePrice	$1799–$2000
US Robotics Mac & Fax Sportster 14.4	$209 suggested retail price	$158–$182

*Prices rounded to nearest dollar. Prices may have dropped since this November 1994 survey. *No longer manufactured.*

So an ApplePrice is what Apple tells reporters a product will cost so consumers have some basis for comparison with similar products, even though the ApplePrice is not necessarily a realistic representation of what retailers will be charging. Everyone clear now? As Curtis explains, "The computer industry works on a cost-plus basis. We have a price list that we operate in terms of selling the products to the resellers. The resellers, in turn, charge what the market will bear based on the value they are adding, the competitive situation, and the location. For example, if you are the only Apple-authorized dealer in Frostbite Falls, Montana, you might be able to charge a slightly higher price."

This disparity between what retailers charge and the ApplePrice in *Macworld* and other magazines can cause problems. When the Quadra 800 was introduced, for example, Apple dubbed it an $1199 product, while most retailers sold it for a minimum of $1249—making both readers and retailers angry. According to one Apple-authorized dealer, who asked not to be identified, "We don't pay any attention to the ApplePrice. We don't know what it is. It's not easily available; it just goes out on press releases."

Mapping the Future

Last October Apple established something called minimum advertised pricing (MAP) for its PowerBooks, Power Macintoshes, and Performas. Apple now requires authorized dealers to advertise those products at or above MAP guidelines—or to omit advertising prices altogether—to get certain benefits. According to Apple, MAP helps "maintain the value of our products and create a consistent price representation." So it's possible that ApplePrices will become more accurate as dealers hew to the MAP line.

The benefit of MAP "is to establish some stability so that Apple dealers can afford to keep selling products," says Ken Kritch, president and CEO of the ComputerWare chain of Macintosh-oriented retailers in the San Francisco Bay Area. Large retailers trying to attract business sometimes advertise Apple products at very low prices—prices that some Apple dealers say they just can't meet.

According to Kritch, MAP programs are very common in the consumer-electronics industry, and as a result, the *advertised* prices for televisions and stereos tend to be very similar. But actual prices may vary: "Circuit City and Best Buy are having a big price war in several markets," Kritch says. "If you go into the stores, prices are lower than advertised."

If Apple is able to enforce its MAP program, consumers may see more stable—and perhaps somewhat higher—prices for Macintosh hardware. But *PC Street Price Index*'s Murphy is skeptical. "Market dynamics will not allow it," he says. "There will be some dealers who observe it, probably the smaller stores. But take a look at the Tuesday science section of the *New York Times* to see a divergence in price. That's going to happen whatever Apple thinks. . . . There will always be the gray marketeers."

Macintosh prices do seem to change practically every month, but compared with the results of price wars in the Windows market, Mac prices are the very soul of stability—for now. If Apple "ever does a good licensing deal with someone, all hell will break loose," warns Murphy. "If Apple allows somebody to clone the Mac, prices would drop even more."

Until then, what's a consumer to do? Plan to read next month's column for some good advice on saving money on your next Macintosh. **m**

You can write to contributing editor DEBORAH BRANSCUM, *Macworld*'s Conspicuous Consumer, at *Macworld*, 501 Second St., San Francisco, CA 94107, or via the Internet (branscum@aol.com).

Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Elizabeth Maffly

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld*'s comparative articles. A ✣ next to a product indicates that we chose more than one product in that category. A ◀ next to a product listing indicates that a native Power Mac version is available.

Hardware

MONITORS

SMALL COLOR MONITORS, Jan 94
14-inch display: ✣ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95.
✣ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; $799.
15-inch display: NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; estimated street price $755.

TWO-PAGE COLOR MONITORS, Nov 94
PressView 21 Display System; SuperMac Technology, 408/541-6100; $3999.

NETWORK HARDWARE

REMOTE-ACCESS SERVERS, Oct 94
Mixed networks: NetConnect Remote Access Server; Asanté Technologies, 408/435-8401; $3899 for eight ports.
AppleTalk networks: ARA Multiport Server; Apple Computer, 408/996-1010; four ports $1799, eight ports $3298.

PRESENTATION HARDWARE

PORTABLE PRESENTERS, Jan 95
Z115; nView, 804/873-1354; $5495.

PRINTERS

COLOR PRINTERS, Aug 94
Low-end ink-jet: DeskWriter 560C; Hewlett-Packard, 800/752-0900; $719.
Solid ink-jet: Phaser 300i; Tektronix, 503/682-7377; $9995.
Thermal-wax transfer and color laser: Phaser 220i; Tektronix, 503/682-7377; $5995.

DYE-SUBLIMATION PRINTERS, Jul 94
Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-7377; $14,995.
Prepress proofing—tabloid size/most complete: Rainbow; 3M, 612/733-1110; estimated street price of $20,000.
Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; $7999.
General publishing and business: Phaser IISDX; Tektronix, 503/682-7377; $9995.

PERSONAL PRINTERS, Sep 94
Ink-Jet: DeskWriter 520; Hewlett-Packard, 800/752-0900; $365.
Laser—$1000 to $1600: microLaser Pro 600; Texas Instruments, 214/995-6611; $1599.

WORKGROUP PRINTERS, Feb 94
High-speed: Hewlett-Packard 4Si MX; Hewlett-Packard, 800/752-0900; $5499.
Best buy: ✣ Apple LaserWriter Pro 630; Apple Computer, 408/996-1010; $2529. ✣ Hewlett-Packard LaserJet 4M; Hewlett-Packard, 800/752-0900; $2329.

SCANNERS/IMAGE CAPTURE

ELECTRONIC CAMERAS, Sep 94
Apple QuickTake 100; Apple Computer, 408/996-1010; $749. ◀

HIGH-BIT FLATBED COLOR SCANNERS, Mar 95
✣ Arcus II; Agfa, 508/658-5600; $3495.
✣ PowerLook; Umax, 510/651-8883; $3495.

LOW-COST COLOR SCANNERS, Nov 93
$1300 to $1600: ✣ La Cie Silverscanner II; La Cie, 503/520-9000; $1599.
✣ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; $1599.
Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

OCR, Nov 93
OmniPage Professional; Caere Corp., 408/395-7000; $995. ◀

SYSTEMS/STORAGE

1.3GB OPTICAL STORAGE, Dec 94
Best low-cost solution: 1.3Gig MO; Club Mac, 714/768-8130; $2099.
Best overall performance: Genesis 1300; Microtech, 203/468-6223; $2899.

DOUBLE-SPEED CD-ROM DRIVES, Jul 93
Sheer speed: Pioneer DRM-604X; Pioneer, 800/444-6784; $1495.
Overall value: AppleCD 300; Apple Computer, 408/996-1010; $599.
Budget choice: NEC MultiSpin 38; NEC Technologies, 708/860-9500; $465.

HIGH-SPEED HARD DRIVES, Aug 93
2.7GB drives: ✣ Nova XL 2700; Microtech, 203/468-6223; $2999. ✣ Vista 3.5GB; Relax, 510/471-6112; $3499.
SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; $499.

PC COPROCESSING, Oct 94
OrangePC Model 210; Orange Micro, 714/779-2772; $1283.

SYSTEM UPGRADES, Feb 95
Upgrade for Macintosh Quadra 650, 800, or 950: Power Macintosh Upgrade Card; Apple Computer, 408/996-1010; $699.
Upgrade for other 680X0 Macs: Replace with Power Macintosh 6100/60 with CPU booster and cache card. Power Macintosh 6100/60; Apple Computer, 408/996-1010; $1819 (base system with 8MB of RAM). PowerClip (CPU booster); Newer Technology, 316/685-4904; $245. 256K cache card; various companies, roughly $200.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94
Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; $599.
Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; $4499.

HIGH-END VIDEO EDITING, Jun 94
Presentation video: ✣ MoviePak2 Pro Suite; RasterOps, 801/785-5750; $4199. ✣ VideoVision Studio; Radius, 408/434-1010; $4499.
Corporate video (offline): Media Composer 400s; Avid Technology, 508/640-6789; $14,995.
Corporate video (online): VideoCube; ImMix, 916/272-9800; $40,500.

PHOTOSHOP ACCELERATORS, Apr 94
PhotoBooster; Radius, 408/434-1010; $999.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Best Ware, 201/586-2200; $199.

continues

MACWORLD Editors' Choice

Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94
Overall: Seven Days in August; Time Warner Interactive Group, 818/955-9999; $79.99.

COMMUNICATIONS/NETWORKS

COMMUNICATIONS SOFTWARE, Aug 94
Basic connectivity: ZTerm; David P. Alverson (no phone number available); $30.
Terminal emulation: Crosstalk for Macintosh; Digital Communications Associates, 404/442-4000; $195.
Internet exploration: VersaTerm; Synergy Software, 215/779-0522; $125.

DOS WINDOWS EMULATION, Oct 94
Timbuktu Pro 1.0.3 for Macintosh, Timbuktu 1.1 for Windows; Farallon Computing, 510/814-5000; $199 each.

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
Faxstf; Telefocus, 816/886-9800; $79.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek, AG Group, 510/937-7900; $795.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

3-D MODELING, Dec 94
Stand-alone modeler: Form Z; autodessys, 614/488-9777; $1495.
Integrated-modeling package: Strata StudioPro; Strata, 801/628-5218; $1495.
Entry-level modeler: Infini-D; Specular International, 413/253-3100; $695.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ✣ ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume.
✣ Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month.
✣ Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; $74.95 per volume, CD-ROM $149.95.
✣ Images with Impact series; 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume, CD-ROM $499.
✣ Typographers' Ornaments; Underground Grammarian, 609/589-6477; $25 per volume; ten TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.
Beginners' program: Aldus SuperPaint; Aldus Consumer Division, 619/558-6000; $149.95.
Overall: Canvas; Deneba Software, 305/596-5644; $399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400; $99 (this price includes the ability to unlock two families from preselected packages); an additional $25 enables you to unlock individual faces, or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/845-6100; $39.95 per face.
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
✣ Aldus Fetch 1.0; Adobe Systems, 206/628-5739; $295.
✣ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

IMAGE EDITORS, Feb 95
Adobe Photoshop 3.0; Adobe, 415/961-4400; $895.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corporation, 408/727-8227; $299.

ONLINE SERVICES

ONLINE SERVICES, Aug 94
E-mail: America Online; America Online, 703/893-6288; basic monthly fee $9.95.
Reference: CompuServe; CompuServe Information Service, 614/457-0802; basic monthly fee $8.95.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93
Alarm system: ✣ First Things First; Visionary Software, 503/246-6200; $79.95. ✣ Smart Alarms Plus; JAM Software, 203/630-0055; $75.

Vendors: Please write to *Macworld Editors' Choice*, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

All-around scheduler: Now Up-to-Date; Now Software, 503/274-2800; $99.
Meeting scheduler: Meeting Maker; On Technology, 617/374-1400; five-pack $495.

GRAPHING SOFTWARE, Aug 94
DeltaGraph Pro 3 3.0.4; DeltaPoint, 408/648-4000; $195.

SALES-AUTOMATION SOFTWARE, Oct 93
✣ Contact Ease; WestWare, 619/274-5053; one user $395, five users $1495.
✣ CBS; Colleague Business Software, 512/345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $129.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Adobe Systems, 206/622-5500; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; Datawatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from various online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, Jun 94
Virtual memory software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory-boosting software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99.

WORD PROCESSORS

HIGH-END WORD PROCESSOR (for fast 68040 Macs and Power Macs), Mar 95
Microsoft Word 6.0; Microsoft Corporation, 206/882-8080; $325.

LOW-COST WORD PROCESSOR, Mar 95
MacWrite Pro; Claris Corporation, 408/727-8227; $99. m

Star Ratings

HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

Macworld Star Ratings lets you compare Macintosh products by providing summaries of *Macworld's* authoritative product reviews from the past year. The number of stars indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones. The ◀ symbol indicates that a product is available in a native Power Mac version.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to *Macworld Star Ratings,* 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS TOOLS

★★★ **4D First 1.0 (1.0.1), ACI US, 408/252-4444, $295.** This entry-level relational database is a low-cost way to distribute the power of 4D and 4D Server to an office full of Macs. It's not much easier to use, however, than the full-fledged 4D. May 94 ◀

★★★ **AccuZip6 1.8.7, Software Publishers, 800/233-0555, $689.** Bulk-mail software has informative progress indicators, batch and individual processing, low rates, and flexible parsing during import, but the interface is incomprehensible. Sep 94

★★ **BaseMap 1.0.1, GeoPoint, 415/957-1560, $149.** For simple maps displaying simple data, this map-making tool may be useful. It's not for the cartographic sophisticate, however, as it offers very limited data-display abilities and only one projection. May 94

★★ **Bulk Mailer CASS 1.00d, Satori Software, 206/443-0765, $150.** Unattended operation is possible with this bulk-mail software, but batch processing is slow and the program has coding problems. Sep 94

★★★ **CA-Cricket Graph III 1.52, Computer Associates International, 516/342-5224, $129.** Graphing software's features are just right for charts in the physical and social sciences, but lack pizzazz. The program is easy to learn and use, and includes math features for data transformations and curve fitting. Dec 94

★★★★ **ClarisImpact 1.0 (1.0 v3), Claris Corp., 408/727-8227, $399.** Business graphing, project management, object-oriented drawing, word processing, and presentation functions merge in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. Jun 94 ◀

★★★★ **ClarisWorks 3.0, Claris Corp., 408/727-8227, $129.** Inexpensive, easy to use, and surprisingly powerful integrated software is hands down the best package available. It's far better in terms of features, speed, integration, and use of system resources than its competition. Feb 95 ◀

★★★ **Cricket Graph III 1.5 (1.52), Computer Associates International, 516/342-6000, $129.** Basic and foolproof charting program produces clean charts, although its feature set is fairly modest. Apr 94

★★★★ **Crystal Ball 3.0, Decisioneering, 303/449-5177, $295.** Compact business-simulation software is fast enough for complex projects and can pay for itself in disaster-avoidance in a variety of business tasks. Oct 94

★★★★ **Decision Analysis 2.5, TreeAge, 800/254-1911, $379.** Decision-assistance software handles complex business cases by constructing tree diagrams of probabilities and payoffs. It offers a type of modeling that is realistic and easy to modify. Nov 94

★★★★ **DeltaGraph Pro 3 (3.5), DeltaPoint, 408/648-4000, $195.** This charting program is the best feature-for-feature value in Macintosh charting. Apr 94 ◀

★★★ **Extend+BPR 3.0, Imagine That, 408/365-0305, $990.** Business-modeling software includes superior templates for business-process reengineering, but some programming experience is helpful. Oct 94

★★★ **FastTrack Schedule 2.1, AEC Software, 703/450-1980, $279.** Simple project-management software is ideal for managers who need to put together a schedule quickly and easily, but if you require more power to manage conflicts, you'll need a more comprehensive program. Sep 94

★★★★ **Helix Express 2.0.1 (2.0.4), Helix Technologies, 708/465-0242, $589.** Icon-based relational-database software's improved performance makes it a serious competitor for all-Mac networks. Especially notable is its much faster speed; multiuser operation is downright snappy. Jul 94

★★★ **InfoDepot 2.0, Chena Software, 610/770-1210, $295.** All-in-one program for project planning includes tools for brainstorming and organizing ideas; scheduling project steps; and entering, calculating, and presenting data. It does a good job but has some flaws. Jan 95

★★★ **Map II 1.5, Think Space, 519/858-5047, $395.** Well-structured program has most of the functions a simple geographical information system needs and is suitable for introductory instruction in GIS and for alert first-time users who just like maps. May 94

★★★★ **MarcoPolo 3.0, Mainstay, 805/484-9400, $895.** Full-featured document-management system is significantly improved. The addition of OCR—both the handling of unrecognized words and the ability to batch-process TIFF files with OCR—make it a very usable system. Jan 95

★★★ **MicMac 2.0v1, Nirvana Research, 408/459-9663, $89.** The concept of Mac as dictation machine is undeniably attractive, and Nirvana Research has pulled it off well. It takes lots of hard drive space to save recordings, though. Nov 94

★★★★ **Microsoft Excel 5.0, Microsoft Corp., 206/882-8080, $339.** Although the feature set of this spreadsheet is stunningly rich, the resource requirements are jaw-dropping, including nearly 30MB of hard drive space plus, to run comfortably, 24MB of RAM. Still, it is relentlessly complete. Jan 95 ◀

★★★★ **Microsoft FoxPro for Macintosh 2.5 (2.6), Microsoft Corp., 206/882-8080, $495.** Dazzlingly fast relational database has a greatly improved interface. For projects of 4 to 20 users that handle large amounts of data, it offers excellent performance. Apr 94

★★★ **Microsoft Works 4.0, Microsoft Corp., 206/882-8080, $99.95.** Although this isn't the best integrated package around, it's a sensible, low-cost choice. It provides users with a respectable word processor, database, spreadsheet, calendar, and address book, as well as a slide-show module, and drawing and communications tools. Jan 95

★★★★ **Pablo 2.0.1 (2.03), Andyne Computing, 613/548-4355, $695.** This effective end-user data-reporting tools puts a considerable workload on the corporate information department, but it sidesteps the hassles of SQL data access and produces great reports with minimal effort. Jul 94

★★★ **Street Atlas USA 2.0, DeLorme Mapping, 207/865-1234, $169.** For the most part, this geographical information software delivers what it promises at a great price. Although inaccuracies in the data are troubling, DeLorme pledges to fix all reported errors in subsequent annual updates. Oct 94

★★★ **TeamFlow 3.1, CFM, 617/275-5258, $295.** Total Quality Management flowchart software is a valuable business tool. Its report printing and customizability are limited, however. Nov 94

★★★★ **TopDown 4.0 (4.1), Kaetron Software Corp., 713/298-1500, $345.** Flowcharting program's support for custom symbols and automatic drawing aids, along with its ability to let you easily create and navigate lower-level charts, make it a productive tool. Jul 94

★★★★ **ZipZapp 1.0, True Basic, 603/298-8517, $39.95.** You can use this data-reference utility to find an area code, the correct spelling of a city's name, and more. The interface is intuitive, and the cost, low. Oct 94

★★★ **ZP4 12.1 (14), Semaphore Corp., 408/688-9200, $125.** Inexpensive bulk-mail software supports batch and individual processing, but the progress indicators are uninformative, and unattended operation requires extra work. Sep 94

continues

Star Ratings

COMMUNICATIONS/NETWORKS

★★ **AccessPC 3.0, Insignia Solutions, 415/694-7600, $129.95.** Utility translates most word-processor and some database formats, but some of its translations result in data loss. Apr 94

★ **BLAST Professional, BLAST Inc., 919/542-3007, $139.** Our reviewer could not get this telecom software to work reliably and consistently, and found the minimalist and quirky interface frustrating. Jan 95

★★★ **Crosstalk for Macintosh 2.0 (2.0.1), Digital Communications Associates, 404/442-4095, $195.** Commendable communications product has a feature set that well matches its competition. Still, the script editing is complex. Apr 94

★★★★ **DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, $100.** File-transfer and translation utility works with floppies, removable drives, and network volumes. Apr 94

★★ **The Internet Companion, The Voyager Company, 914/591-5500, $29.95.** Well-written, HyperCard-based electronic book offers less information than others. Internet access is available through accompanying software, but it's a terminal-emulation screen. Dec 94

★★★★ **Internet Explorer Kit and Internet Starter Kit, Hayden Books, 317/581-3500, $29.95 each.** Well-written books and useful software combine to produce one of the best introductions to the Internet available for Mac users. Dec 94

★★★★ **Internet Membership Kit, Ventana Media, 919/942-0220, $69.95.** If you need access to the Internet, this book and software combination is a good package. The best part about it is its included preconfigured software. Dec 94

★★★★ **MacLink Plus/Translators Pro 7.5, DataViz, 203/268-0030, $149.** If your PC files are in archaic formats, you'll need this file-transfer and translation utility. It's a great option for most users. Apr 94

★★★ **MicroPhone Pro 2.0, Software Ventures Corp., 510/644-3232, $295.** The new feature set of this communications package includes multiple sessions, faxing, TCP/IP networking, and more, but it's a mixed bag. Not all the features are well integrated, although some are innovations for which users will be grateful. Oct 94

★ **PowerShare Collaboration Servers, Apple Computer, 408/996-1010, $999.** Before this collaboration software will be ready for prime time, Apple needs to overhaul the Admin application, add serious diagnostic aids, and provide comprehensive documentation. Aug 94

★★★ **QuickMail 3.0, CE Software, 515/221-1801, $199 to $3799.** If you're shopping for a first-time E-mail application, this product is a good choice for ease of use and setup. The most promising new tool, rules-based messaging, lacks some important features. Jan 95

★★★ **RunShare, Run, Inc., 408/353-8423, $199 to $2499.** System extension endeavors to pump up file-transfer speeds across both local- and wide-area networks. It offers twofold to threefold throughput gains for fast Macs and large files but is less useful with small files or slow Macs. Feb 95

★★★ **SITcomm 1.0 (1.0.1), Aladdin Systems, 408/761-6200, $120.** Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. Apr 94

★★★ **Snap Mail 1.0.1, Casady & Greene, 408/484-9228, $200 to $1440.** Software will put you on the E-mail trail more cheaply than any competing product, if you can live with some minor shortcomings. Jun 94

★★ **SoftPC 3.1, Insignia Solutions, 415/694-7600, $499.** While the speed of this Windows PC emulator is greatly improved, buying an add-in PC card for your Mac is more efficient. Mar 94

★★ **SoftWindows 1.0, Insignia Solutions, 415/694-7600, $499.** You can run Windows software on a PowerMac with this emulation software, but although it's a viable solution, you pay the price in terms of performance, compatibility, and actual cost. Aug 94

★★★★ **Timbuktu Pro 1.0 (1.05), Farallon Computing, 510/814-5000, $199 to $1999.** Terminal emulation product is a must-have for people who need direct connection to computer systems on a variety of networks. May 94

★★ **TrafficWatch II 2.0 (2.1), Neon Software, 510/283-9771, $495.** The price of this AppleTalk traffic monitor is closer to that of full-blown network analyzers that do much more. Without printing, alarms, or true multiprotocol support, this product misses the mark. Jun 94

★★★★ **White Knight 12.0, The FreeSoft Company, 412/846-2700, $139.** While this telecom software can be bewildering, it works impressively well. If you're willing to read the manual, the program may become your favorite telecom tool. Nov 94

DESKTOP PUBLISHING

★★ **CheckPost 1.3, Working Software, 408/423-5696, $249.95.** Interface aside, this imagesetter-simulation software is generally disappointing. It can't automatically scale pages, it prints on a single sheet, and its error reporting is limited. Nov 94

★★★ **ClickBook 1.1, BookMaker Corp., 415/354-8161, $69.95.** If you need to create inexpensive booklets quickly and without hassle, this print utility that helps you format documents in double-sided booklet form is an excellent tool. Nov 94

★★★ **Download Mechanic 1.0.2, Acquired Knowledge, 619/587-4668, $249.** The strengths of this PostScript downloader lie in its tools for dealing with problem files, but when dealing with large files, it performs slowly and occasionally crashes. Feb 95

★★★★ **FontChameleon 1.0.1 (1.5), Ares Software Corp., 415/578-9090, $295.** Font utility introduces a new font-creation technology; it builds serif and sans serif fonts from a master outline file. It offers high-quality renditions of popular fonts, plus the ability to customize fonts. Sep 94

★★★ **FontMixer 1.0, Monotype Typography, 312/855-1440, $79.** Although a tad expensive for a one-trick pony, this font utility is a straightforward, relatively painless way to mix characters from different fonts to create composite fonts. Oct 94

★★★★ **Fontographer 4.0.4 (4.1), Altsys Corp., 214/680-2060, $495.** No other font editor does more than this one. For the price of a few font families, it can give you a universe of unique faces. Oct 94

★★ **FotoTune 1.1 (1.13), Agfa Division of Miles, 508/658-5600, $395.** Color-management software has a capable engine, but it's not a complete color management system. Invisible tech support and poor documentation were only part of the problem. Apr 94

★★★★ **FrameMaker 4.0 (4.04), Frame Technology Corp., 408/433-3311, $895.** For long, structured documents this desktop publishing program is one of the best tools available. Mar 94

★★★★ **LaserCheck 1.0, Systems of Merritt, 205/660-1240, $199.** Imagesetter-simulation software can save you hundreds of dollars, and many hours, on imagesetting jobs by letting you use a laser printer to proof your work. Nov 94

★★★★ **Let'er RIP 2.0, Lupin Software, 916/756-7267, $239.** The flexibility, clean implementation, and attention to detail of this PostScript downloader make it a pleasure to use. Feb 95

★★★★ **PageTools 1.0, Extensis Corp., 503/274-2020, $129.** Collection of ten PageMaker Additions is packed with utility. Many users will find the PageAlign, PagePrinter, and PageRulers Additions alone worth the price, and the others frosting on the cake. Dec 94

★★★★ **Print Shop Deluxe 1.0 (1.1), Broderbund Software, 415/382-4400, $49.95.** Create professional-looking greeting cards, signs, banners, stationery, and calendars with these desktop publishing templates and graphics. While it's not a substitute for a high-end program, it is easy to use and inexpensive. Apr 94

★★★ **ReadySetGo 6.0.2, Manhattan Graphics Corp., 914/725-2048, $395.** There's no strong reason not to use this destop publishing software if its tools meet your needs, but there's no compelling reason to choose it, either. Its low price is nice, but not enough. Oct 94

EDUCATION/ENTERTAINMENT

★★★ **Aquazone 1.0, Inago, 416/487-4005, $79.95.** The fish in this aquarium simulation are beautiful, but they're darned hard to keep alive. Only two varieties of fish are included. Jan 95

★★★ **Creative Writer 1.0, Microsoft Corp., 206/882-8080, $64.95.** Graphics/page-layout/word-processor hybrid offers some terrific type effects, zany sounds, and bright graphics. While it doesn't teach kids to be better writers, it does encourage them to develop ideas and provides a fun vehicle to express those ideas creatively. Sep 94

★★★★ **Crossword Wizard 1.0, Cogix Corp., 415/454-7217, $49.95.** If you're a crossword fan, this crossword-puzzle generator is a must. Although it's not perfect, the play mechanics are fantastic. Dec 94

★★★ **The Cruncher, Davidson & Associates, 310/793-0600, $59.95.** If you want to teach a child spreadsheet basics, this combination educational spreadsheet and business application will do the job. It's creative and easy to use, but slow. Aug 94

★★★★ **Crystal Crazy, Casady & Greene, 408/484-9228, $49.95.** Ultraglossy, superpolished version of the classic Crystal Quest is challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. Jun 94

★★★ **Firefall Arcade 1.0 (1.0.2), Inline Software, 617/935-1515, $49.95.** If you loved the classic video game Centipede, or are just looking for a fun shoot-'em-up, this arcade-style game will satisfy. Jun 94

★★★★ **Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $395.** CD-ROM encyclopedia has excellent search capabilities and is lots of fun. Its timeliness and some hierarchical snafus were slight problems. Jul 94

★★★★ **Myst 1.0 (1.01), Broderbund Software, 415/382-4400, $59.95.** The smooth pacing of actions and sounds in this beautiful CD-ROM game give it a dreamlike quality. This is a game that's been polished until it shines. Mar 94

★★★★ **SimCity 2000, Maxis Software, 510/254-9700, $54.95.** Your goal with this marvelous city-simulation is to build a city and run it successfully. The game is fascinatingly complex but simple to use. Jun 94

★★★ **Small Blue Planet 1.2.1, Now What Software, 415/885-3432, $79.95.** Nicely integrated collection of beautiful Earth-from-space images on CD-ROM

ADD YOUR *Handwriting* TO THE FONT MENU!

Arial
Courier
▶ *Your Font*
Helvetica
Times

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Version 1.1

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CREATE YOUR FONT TODAY!

For your own Personal Font, simply write the 26 words as well as the capital letters, numbers and punctuation found on the back of this page. From that sampling, Signature Software font designers will individually convert your handwriting into a custom font which duplicates the unique way you create each word - not just each letter. Your font will include your signature and will even have a name which you specify.

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Personal Font captures your handwriting at its best. Your font has the same style and character as your own handwriting - without the inconsistencies and inkblots! With your own Personal Font in the Font Menu you'll find yourself creating handwritten notes without hesitation - straight from your keyboard!

Since each order is custom, please allow two to four weeks processing time. If you're in a hurry, for an extra $25 Signature Software will ship your order within five working days.

Actual Handwriting vs. Personal Fonts:

Peter's actual handwriting.
Peter's Personal Font.
Peter Matthews - Toronto, ONT

Colin's actual handwriting.
Colin's Personal Font.
Colin Johnson - Portland, OR

Your Personal Font can be installed and used as simply as an "ordinary" font. It appears in your menu and functions just like any other typeface in your computer.

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PC - Windows 3.1
Postscript printers or interpreters. On non-Postscript printers, characters will be disconnected, just as they appear on the screen, *similar to this.*

You're looking at a font of my handwriting. If you look closely, you'll find that each character is tailored to the characters around it. The font - by itself - does this automatically. For example, look at my "s" letters in the word "subsystems." When I filled out the form on the next page, I connected most, but not all, of my letters. Even if you don't connect ANY of your letters, everything you'd like to do in long-hand you can now do straight from your keyboard - including numbers, letters, punctuation, and your signature - in any size you want. Just carefully write 26 words and a few symbols once, and from then on all your handwriting will be at its best. I'm proud of my Personal Font and hope you enjoy yours, too!

Dave Fenwick
Signature Software, Inc.
(800) 925-8840

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Form#11PF

Signature Software for Mac and Windows

Personal Font™

The Original Custom Cursive Handwriting Font

SAMPLE FORM INSTRUCTIONS

1. Write your signature within the Signature box. For best results, try to ensure that the signature fits within the box.
2. Write the words shown within each box using the broken lines as a base. Begin each word on the left side of the boxes. Characters can be connected or disconnected or a combination of both!
3. Write naturally and consistently. Practice first on a separate sheet of paper. Remember, what you write here will become the final font.
4. For best results use a rollerball or fibertip pen. **Do not use ballpoint pens or pencils!**
5. Use the grid lines in the boxes as an aid to maintain consistent height and slant. Be sure capital letters are proportional to lower case letters.
6. Write your capitals normally. Consider the appearance of capitals when at the beginning of words AND when words are all capitalized. Don't forget the punctuation!
7. Name your font and complete the ordering information on the front of this form. **Indicate PC or MAC on card!**

Name:_____ Phone #: _____

NOTE: Strike out mistakes and write corrections nearby. Signature Software can even make changes after you receive your font!

kagvels

kagvels

kagvels

NAME YOUR FONT!

The name must be seven alphabetic characters or less.

Signature (your name)

adjoint

bowman

cyclops

doubt

egtype

forgiven

grocery

hydrodyke

ionize

jewfishes

kagvels

lysozyme

mojxe

novque

oxyfobe

polygyne

quote

rybema

skyque

toyjoke

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Personal Font Personalized Handwriting Font

Signature Software, Inc. - Reader Service #300

1-503-386-3221 or 1-800-925-8840

lacks many features of standard atlases and doesn't have a search function, but is endlessly fascinating. Jul 94

★★★★ **Spin Doctor (1.0), Callisto Corp., 508/655-0707, $59.95.** In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It's part strategy game, part kinetic sculpture. Jun 94

FINANCE/ACCOUNTING

★★★★ **Andrew Tobias' TaxCut 1993, MECA Software, 203/255-1441, $79.95.** The free-form approach and flexible Help menus of this tax-preparation software make filling out your tax return a smooth, almost relaxing process. Apr 94

★★★ **ExpensePlus 1.0.1 (1.0.2), State of the Art, 714/753-1222, $139.95.** Software uses a Newton MessagePad to record expenses, then sends the data to a Mac to create and print expense reports. Apr 94

★★ **Financial Competence 1.5, Competence Software, 603/435-5098, $99.** Business economics tutorial explains how financial statements are compiled and how they relate to each other. Jul 94

★★★★ **MacInTax 1993, Intuit, 602/295-3110, $69.95.** Tax-preparation software provides a reliable, structured interface for building your tax return. Apr 94

★★★ **MacInTax Tax Planner, Intuit, 602/295-3110, $29.95.** Construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. Apr 94

★★★ **MacInTax Tax Savings Guide, Intuit, 602/295-3110, $19.95.** Collection of tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Apr 94

★★★ **MacMoney 4.01, Survivor Software, 310/410-9527, $89.95.** Personal-finance software has new and improved features that will please longtime users, but it hasn't kept up with the leaders in the field and won't win many new converts. Jul 94

★★★ **Managing Your Money 6.0, MECA Software, 203/255-1441, $79.95.** Personal-finance program does a good if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

★★★★ **Quicken 5.0, Intuit, 415/322-0573, $49.95.** The addition of a calendar and new ease-of-use features keep this personal-finance software comfortably ahead of the pack. This upgrade is an incremental but welcome improvement to an already excellent product. Feb 95

★★★ **StreetSmart 1.0, Charles Schwab & Company, 800/334-4455, $59.** If Schwab is where you want your investments held, and if you want to have tighter control over your portfolio and save on brokerage fees, you should seriously consider this financial investment software. Feb 95

GRAPHICS

★★★★ **Adobe Illustrator 5.5, Adobe Systems, 415/961-4400, $595.** Despite slight speed disappointments, this draw program's upgrade is a bargain. It includes more than 200 tile patterns, 220 fonts, and the Acrobat Distiller and Exchange utilities. Sep 94

★★★★ **Adobe Photoshop 3.0, Adobe Systems, 415/961-4400, $895.** Image-editing program both broadens its capabilities and simplifies its work environment in this dynamic upgrade. While not perfect, the pros far outweigh the cons. Jan 95

★★★★ **Aldus FreeHand 4.0 (4.0a), Adobe Systems, 206/622-5500, $595.** The new page-design and text-editing functions of this powerful draw program make it more than worth the price of admission. Mar 94

★★ **Art Explorer 1.0, Aldus Consumer Division, 619/558-6000, $49.95.** While its cartoon style is refreshing, this paint/draw program for kids 8 to 12 years old is still rough around the edges. Its biggest limitation is that it's unusably slow on 68030 Macs. Feb 95

★★★★ **Blueprint 5.0, Graphsoft, 410/290-5114, $295.** For plain old 2-D drafting, this CAD software has a rich, easy-to-use feature set and is admirably fast. The Power Mac version in particular is a first choice for large architectural or engineering diagrams. Jan 95

★★★ **ClarisDraw 1.0, Claris Corp., 408/727-8277, $399.** For presentations without grand artistic pretensions, this draw program can be an effective tool. However, $400 may be too much to pay. Jan 95

★★★ **Dabbler 1.0, Fractal Design Corp., 408/688-5300, $99.** Art-education and paint software provides an excellent paint set with an appealing if slightly quirky interface, at a great price. Nov 94

★★★★ **DeBabelizer Lite 1.0 (1.1), Equilibrium Technologies, 415/332-4343, $129.** Terrific graphics utility converts graphics files from one format to another. It offers a choice selection of capabilities at a nice, slim price. Aug 94

★★★ **DesignWorkshop 1.0 (1.1), Artifice, 503/345-7421, $895.** The accessible interface and versatile modeling environment of this 3-D modeling software may be worth the fairly high price, particularly for architectural-design conceptualization. May 94

★★★★ **ElectricImage Animation System 2.0, Electric Image, 818/577-1627, $7495.** Although the price seems high, this software, with its extraordinary animation and image-rendering capabilities, is worth every penny for cinematic-production professionals. Dec 94

★★★ **Flying Colors, Davidson & Associates, 310/793-0600, $40.** While not the most dynamic kids' program, this paint/draw program provides easy-to-use tools and nicely drawn stamps for ages eight to adult. Feb 95

★★★★ **IntelliDraw 2.0, Adobe Systems, 619/558-6000, $129.** Wonderful general-purpose graphics package works well, does a great job of automating drawing tasks, and is straightforward. Despite its breadth of features, it always feels approachable. Sep 94

★★★★★ **Kai's Power Tools 2.0a (2.1), HSC Software, 310/392-8441, $199.** Phenomenally powerful suite of Photoshop plug-ins have an addictive quality typically associated with arcade games. May 94

★★★ **Koyn Fractal Studio 2.02 (2.1), Koyn Software, 314/878-9125, $119.95.** Software lets you generate beautiful fractals of your own design. It's a reasonable choice if you are interested in Sierpinski triangles or naturalistic forms, but it's not an all-fractals-for-all-people program. Aug 94

★★★★ **KPT Bryce 1.0, HSC Software, 805/566-6200, $199.** For less than $200, you get a remarkable 3-D landscape-rendering program, a CD-ROM full of images, a slide-show utility, and even some screen-saver modules. Although the innovative, graphics-heavy interface can be confusing, this software is lots of fun. Dec 94

★★★ **Live Picture 1.5.5, HSC Software, 805/566-6200, $3995.** Promising image editor is rather rudely assembled atop some marvelous technology and burdened by an extremely high price tag. Though fast and blessed with all the benefits of a proxy-based system, its day-to-day functions leave room for improvement. Dec 94

★★★★ **LogoMotion 1.0, Specular International, 413/253-3100, $149.** Easy-to-use 3-D package is eminently affordable. It's a terrific program, both for creating flying logos and as an entry-level 3-D package for nonprofessionals. Nov 94

★★★★ **MacroModel, Macromedia, 415/252-2000, $1495.** This 3-D modeling software is a solid resource to have along when you venture out into 3-D space. The interface is elegantly simple. May 94

★★★★ **MetaFlo', The VALIS Group, 415/435-5404, $595.** Graphics utility yields interesting visual effects with a minimum of fuss. It imparts elasticity to 2-D images, letting you push and pull collections of pixels while retaining the visual integrity of the image. Aug 94

★★★★ **MiniCad 5, Graphsoft, 410/290-5114, $795.** Excellent CAD software offers major performance for its price. It's admirably easy to learn. Nov 94

★★★★ **Paint Alchemy 1.0, Xaos Tools, 415/487-7000, $99.** These plug-in graphics effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

★★★ **PhotoMatic 1.01, DayStar Digital, 404/967-2077, $199.** AppleScript-based utility lets you automate tasks in Adobe Photoshop 2.5.1 or later. Although it's limited, it can relieve you of mundane chores. Nov 94

★★★★ **Pixar Typestry 2.1, Pixar, 510/236-4000, $299.** With QuickDraw GX support, an approachable interface, a strong array of animation features, and outstanding image quality, this 3-D type-effects software is worth a try. It adds a new dimension to the way you look at type. Feb 95

★★★ **Pointillist, Pictor GraFX, 310/865-0495, $39.95.** Stereogram software creates images that look like random dots, but a 3-D image emerges from the pattern and appears to hover inches in front of the background. Jul 94

★★ **Ray Dream Designer 3.0.3 (3.1), Ray Dream, 415/960-0768, $349.** Although this 3-D-illustration software remains a price leader, unstable operation, misbehaving features, and sluggish performace are problems that need to be rectified. Jul 94

★★★ **ScanPrepPro 1.2, ImageXpress, 404/564-9924, $695.** Adobe Photoshop add-on automates the scanning and image-massaging process and produces good results, although it's somewhat unstable. Nov 94

★★★★ **Scenery Animator 1.0.4 (1.1), Natural Graphics, 916/624-1436, $149.** Landscape rendering and animation software uses U.S. Geographical Survey data to create remarkably realistic 3-D representations of terrain. Its flaws are few, and our reviewer recommends it. Aug 94

★★★★ **Showplace 2.0 (2.1), Pixar, 510/236-4000, $495.** Adequate, entry-level, 3-D modeler is suitable for illustration and other graphic arts. Apr 94

★★★ **Specular Collage 2.0.1, Specular International, 413/253-3100, $399.** Practical image-compositing solution supplies a smooth interface and strong support for Adobe Photoshop 3.0. As long as you're willing to return to Photoshop to confirm your edits and make final changes, it's a serviceable tool. Feb 95

★★★★ **StudioPro 1.0 (1.1), Strata, 801/628-5218, $1495.** If you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, this application is an excellent choice. Mar 94

★★★ **Terrazzo 1.0, Xaos Tools, 415/487-7000, $199.** Turning a random group of pixels into a geometric pattern may not be everyone's passion, but this plug-in graphic-effects module has appeal for a select niche of fabric, graphic, and video designers. Nov 94

★★★★ **TextureScape 1.5, Specular Interna-**

continues

Star Ratings

tional, 413/253-3100, $195. Algorithmic art program lets you manipulate and arrange PostScript shapes to create seamlessly repeating patterns. Like the best tools, it's simple enough to be fun and flexible enough to give you meaningful control. Feb 95

★★★ **Typestry 2.0 (2.1), Pixar, 510/236-4000, $299.** An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. Jun 94

★★★★ **TypeTwister 1.0, Adobe Systems, 415/961-4400, $29.95.** Inexpensive, easy-to-use, and fun type styler lets you create wildly styled text effects, although it won't satisfy hard-core type manipulators. Jan 95

★★★ **Vistapro 3.0, Virtual Reality Laboratories, 805/545-8515, $149.95.** 3-D landscape rendering software uses digital versions of U. S. Geological Survey maps to create images and allows you to add external features such as buildings and rivers. Although it's a good program, it has some limitations. Feb 95

MATH/SCIENCE

★★★★ **Caduceus Science Review Macintosh Project 1.0 (1.1), Scientia, 617/776-3427, $250.** If you're taking the MCAT, you'd be nuts not to buy this interactive science review. With proper use, its 9MB of files are certain to improve your score. Apr 94

★★★★ **Chamber Works 1.0.2 (1.1), OnScreen Science, 617/776-6416, $99.** Simulator for particle-physics events is the best introduction to particle physics yet produced, at a great price. Dec 94

★★★★ **JMP 3.0, SAS Institute, 919/677-8000, $695.** New features of this statistics software include floating tool palettes, an annotation tool for data tables, and an experimental-design module. Sep 94

★★★ **Kekulé 1.1, PSI International, 410/821-5980, $495.** Science software reads scanned chemical-structure drawings and interprets them, giving both a diagram for checking interpretation accuracy and a formal string representation of the structure. Nov 94

★★★★ **LabView for Mac 3.0.1, National Instruments, 512/338-9119, $1995.** For large-scale, demanding projects in data acquisition and analysis, this scientific software is an unchallenged standard. Jul 94

★★★ **Maple V 3.0, Waterloo Maple Software, 519/747-2373, $795.** If you prefer to do your own programming and function creation, you'll benefit from this symbolic mathematics software's efficient use of your Mac's resources. This version hits most of the points on your symbolic-math wish list. Oct 94

★★★★ **MATLAB 4.1, The Math Works, 508/653-1415, $1695.** Relatively expensive numerical math software has added nearly 100 new graphics commands, improved its treatment of sparse matrices, and added commands for sound processing. Nov 94

★★★★ **Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, $225.** Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. Jun 94

★★★★ **SerePlot 2.12, Scientfic Visions, 301/593-0317, $135.** If you have piles of data and don't need animated, exploding bar-charts in 24-bit color, this scriptable plotting software should be part of your analysis tool kit. Jun 94

★★★★ **Spyglass Plot 1.0, Spyglass, 217/355-6000, $295.** This scientific-charting software is the first choice for serious large-set plot crunching. Oct 94

★★★★ **SuperScope II 1.25, GW Instruments, 617/625-4096, $1490.** Despite a relatively small instrument library, this laboratory data-acquisition software effectively covers a wide range of needs, and learning to use it won't become your life's work. Oct 94

★★★★ **Survival Tools 1.0, Abacus Concepts, 510/540-1949, $295.** The combination of survival analysis with the StatView template systems gives you a virtual actuary-in-a-box. It's a great set of tools, conveniently packaged. Feb 95

ORGANIZATION/PRODUCTIVITY

★★★★ **Arrange 2.0, Common Knowledge, 415/325-9900, $349.** If your needs fall beyond the usual calendar and address-book functions, this personal information manager is a strong contender. It now has more calendar functions and print options. Dec 94

★★★ **Claris Organizer, Claris Corp., 408/727-8227, $99.** New personal information manager users, lured by the low price, good performance, and ease of use of this product, will find that it meets their needs. Most longtime PIM users won't be tempted to switch. Jan 95

★★★★ **DateBook & TouchBase Pro Bundle 4.0, Adobe Systems, 619/558-6000, $89.99.** Personal information manager package is now easier to use and offers many new features. The excellent linking between contacts and calendar is a strong feature. Sep 94

★★★ **DateView 1.0.1 (1.0.2), Advanced Software, 515/225-4163, $99.95.** If you're willing to sacrifice some features to get simplicity and speed, this calendar/to-do manager makes sense. It integrates with the contact manager, InTouch. Aug 94

★★★ **Dynodex for Macintosh 3.5, Portfolio Software, 802/434-6400, $69.95.** Excellent contact manager has a few new features, improved performance, and an easier-to-use interface. Sep 94

★★★ **FastPace Instant Contact 1.0, Foresight Technology, 817/731-4444, $79.99.** Although this contact manager could use a few additional features—especially a menu-bar search function—it does a capable job, and it is intuitive and easy to use. Jan 95

★★★ **First Things First Proactive 1.1, Visionary Software, 503/246-6200, $149.** Capable scheduling program has some convenient features. It's worth a look if you don't have to share information with a contact manager. Nov 94

★★★ **Full Contact 2.01 (2.02), FIT Software, 408/562-5990, $169.** Personal information manager can handle with speed and style tasks that would choke other products, but frequently, using it feels like a full-time job. Aug 94

★★★★ **In Control 3.0.4, Attain Corp., 617/776-1110, $85.** Excellent to-do-list manager and outliner, coupled with a good calendar is a strong choice if you live and die by to-do lists. Oct 94

★★★ **Now Contact 1.0 (1.1), Now Software, 503/274-2899, $69.** This contact manager has some innovative features and could easily become the top address-book program for the Mac by adding some features, such as file reconciliation. Mar 94

★★ **Souvenir 2.2, ComposeTel, 415/327-0744, $49.** While this contact manager is fast and simple, it's hard to recommend it when you can buy integrated contact managers and schedulers for the same price. Dec 94

★★★ **TimeSquare 1.0, Team Building Technologies, 514/278-3010, $149.** Fast, flexible, network calendar program has lots of handy features, but it's missing a few as well, such as multiday events and label grouping. Aug 94

PRESENTATION TOOLS

★★★★ **Adobe Premiere 4.0, Adobe Systems, 415/961-4400, $795.** Video-editing software for the Power Mac remains solid and reliable and has new and improved professional-level features. With the right hardware, it can give desktop-video editors broadcast-quality products with a minimum of compromises. Dec 94

★★★ **Amazing Animation, Claris Corp., 408/727-8277, $59.** Cute pictures, funny sounds, and a kid-friendly interface come together in this package that lets children produce short animations or interactive presentations. The canned animations and scenes grow tiresome, however. Jan 95

★★ **Animation Master 2.0.5, Hash Enterprises, 206/750-0042, $699.** Although this animation software packs extraordinary power at a reasonable price, it's difficult to learn and prone to instability. Oct 94

★★★ **Deck II 2.1, OSC, 415/252-0460, $399.** AV Macs turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization features. Jun 94

★★★★ **FlipBook 1.0, S. H. Pierce, 617/338-2222, $89.** Animation-printing utility lets users make flipbooks out of QuickTime movies, PICS animations, and Scrapbook files. Jun 94

★★★ **HyperCard 2.2, Apple Computer, 408/996-1010, $249.** Authoring tool strikes a good balance between power and ease of use, and its price is reasonable. It may not satisfy all your wishes, but it should keep you happily building stacks. Sep 94

★★★★ **Macromedia Director 4.0, Macromedia, 415/252-2000, $1195.** Although this multimedia program remains far from easy to use, this admirable upgrade increases the program's power and improves its interface. Multimedia professionals will continue to find it the best package available. Sep 94

★★★ **Microsoft PowerPoint 4.0, Microsoft Corp., 206/882-8080, $399.** If you're in the market for a presentation-graphics program, this is a good choice to use along with Word or Excel, as long as you don't mind the lack of animation functions. For general purposes, though, other alternatives have the edge. Feb 95

★★★★ **Morph 2.0 (2.5), Gryphon Software, 619/454-6836, $239.** Easy to use morphing software is beautifully designed, with delightful new features, including the ability to morph QuickTime movies. Using it is as painless as morphing gets. Apr 94

★★ **MovieWorks 2.0.2, Interactive Solutions, 415/377-0136, $295.** With diligence you can get decent results with this all-in-one QuickTime-based multimedia package. But other entry-level programs make leaping into multimedia easier and more rewarding. Sep 94

★★★ **The Multimedia Workshop 1.0, Davidson & Associates, 310/793-0600, $79.95.** Children or adults can use this media-integration tool without big investments of either time or money. It's full of compromises, though. Nov 94

★★★ **Passport Producer Pro 1.0 (1.1.2), Passport Designs, 415/726-0280, $995.** Superb, albeit quite expensive, media-integration package makes assembling even complex presentations surprisingly easy. Path animation is limited to entrances and exits. Apr 94

★★★★ **Persuasion 3.0, Adobe Systems, 206/622-5500, $339.** Users have plenty of new features to

cheer about, including improved tool palettes, extensive charting options, and hypertext functions with this presentation graphics program's upgrade. High memory and disk-space requirements are drawbacks. Sep 94

★★★ **SoundEdit 16, Macromedia, 415/252-2000, $379.** Digital audio software supports 16-bit sound and has enough goodies to earn it a place in a multimedia producer's toolbox. But its lack of record-level controls limits its usefulness as a professional audio tool. Dec 94

★★★★ **SuperCard 1.7.1, Allegiant Technologies, 619/587-0500, $495.** Multimedia authoring system adds a few welcome enhancements, including QuickTime support, and squashes some old bugs. For current users, the upgrade is well worth the price; for others, it's an excellent alternative to more expensive authoring systems. Feb 95

PROGRAMMING

★★★ **IDL 3.5, Research Systems, 303/786-9900, $1500.** If you're an image processing professional, you should consider adding this shockingly powerful, compact, graphics-oriented, interpreted language to your tool kit. Oct 94

★★★★ **Object Master for Think C and C++, ACI US, 408/252-4444, $255.** Object-oriented development environment is full of goodies and will pay for itself due to increased programmer productivity. Apr 94

★★ **ScriptWizard 1.0, Full Moon Software, 408/253-7199, $99.** Software attempts to make writing and debugging AppleScript scripts easier but doesn't offer enough improvement over Apple's Script Editor. Jan 95

★★★ **VIP BASIC 1.0.1 (1.0.3), Mainstay, 805/484-9400, $295.** Programming language lets programmers who know only BASIC get started producing real, if interpreted, Mac programs. It's a serious developer's tool, though it's not on the same footing as VIP-C. Jun 94

★★★★ **VIP-C 1.0.1 (1.5.1), Mainstay, 805/484-9400, $495.** If you've mastered the rudiments of C, this programming-code generator will let you code about ten times faster than you could using only an editor. Its real strength is in rapidly assembling smaller projects. May 94

★★★★ **VIP-C 1.5, Mainstay, 805/484-9400, $495.** For convenience in producing 680X0/Power Macintosh applications, this programming utility is a fine investment. Intermediate to advanced users will get the most benefit, but even beginners will find that it helps turn student projects into serious apps. Feb 95

UTILITIES

★★ **Apple Personal Diagnostics 1.0 (1.1), Apple Computer, 408/996-1010, $129.** In trying to make a hardware tool for the rest of us, Apple has come up short. This hardware-diagnostics utility has an uneven manual, some less than thorough tests, and a surprisingly unsatisfying interface. Nov 94

★★★ **AppleSearch 1.0, Apple Computer, 408/996-1010, $1799.** Although it has some rough edges, this product for archiving and retrieving text is highly useful. It presents retrieved information clearly and extracts text from documents in many formats. May 94

★★★ **Atticus Vista 1.0 (1.0.2), Atticus Software Corp., 203/348-6100, $69.95.** Control panel and application automatically catalog the disks you mount on the desktop. It has a few problems, but it can help bring order to disorganized disk collections. May 94

★★★★ **Automap Road Atlas for Macintosh 2.01 (2.04), Automap, 206/455-3552, $99.95.** Mapping software tells you how to get where you're going better than any other map or software our reviewer has seen. Although screen redraw is slow, it's worth it for the written directions and maps. Jul 94

★★★★ **Cal 1.0, Thought I Could, 212/673-9724, $79.95.** Well-chosen set of desktop necessities includes an excellent calculator, an associated-formula editor, a datebook, and a calendar. Due to its easy access and ample power, this software has become an everyday tool for our reviewer. Jan 95

★★★ **CD AllCache 2.0, CharisMac Engineering, 916/885-4420, $79.95.** CD-ROM accelerator improves access time by caching a CD's directory and putting its most frequently used data into RAM. Despite this software's limitations, most CD addicts will find the speed improvement worth the trouble. Sep 94

★★★★ **CD-ROM ToolKit 1.0.5 (1.1), FWB, 415/474-8055, $79.** Software accelerator can halve the time it takes to open files and search on a CD-ROM. May 94

★★★★★ **Conflict Catcher II 2.1.1, Casady & Greene, 408/484-9228, $79.95.** Customizable, fast, and safe extension-management utility goes well beyond the basics. For Power Macintosh users, it even tells which extensions aren't written in native code and are likely to slow down Power Macs. Oct 94

★★★ **DiskDoubler 4.0, Symantec Corp., 503/334-6054, $79.95.** In pure efficiency terms, this file-compression software is a winner, but it lacks many features of previous versions, including passwords on self-extracting files and automatic recompression. Aug 94

★★★★ **DiskTop 4.5 (4.5.1), PrairieSoft, 515/225-3720, $99.95.** Organizing a crammed hard drive is a more manageable task with this simple but powerful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder. Jul 94

★★★ **The Disney Collection Screen Saver, Berkeley Systems, 510/540-5535, $49.99.** Mickey, Goofy, Peter Pan, Ariel, and other Disney favorites cavort around your screen with this screen saver. Mar 94

★★★★ **Drive7 3.0, Casa Blanca Works, 415/461-2227, $79.95.** Highly recommended hard drive-formatting utility easily formats and partitions most drives and provides all the options you need. And within its limitations, its Mount Cache utility provides a real performance boost. Nov 94

★★★ **eDisk 2.0, Alysis Software Corp., 415/928-2895, $149.95.** Driver-level software compresses data read to your drive on the fly and automatically expands data read from your drive. It offers transparent compression. Dec 94

★★★★ **Icon Mania 1.0 (1.01), Dubl-Click Software, 503/317-0355, $69.95.** Delightful icon-editing utility comes with terrific tools for building new icons, including an outstanding thumbnail feature that builds custom icons from graphics files. Aug 94

★★★★ **Kaboom 3.0, Nova Development Corp., 818/591-9600, $49.95.** Sound-effects utility with sound-editing application is a fun program for anyone who wants to play with sound. Feb 95

★★★★ **Launch Pad 1.0, Berkeley Systems, 510/540-5535, $49.99.** If you want to share your Mac with your kids, this desktop utility is a worthwhile investment. It can even speak menu items and file names out loud for kids too young to read. Jan 95

★★★★ **MacTools 3.0, Central Point Software, 503/690-8090, $149.** Recovering trashed files is a snap with this utility package that fixes more disk problems than its competition. It includes disk-and-file maintenance, disk repair, virus protection, and backup. Mar 94

★★★★ **Maxima 3.0, Connectix, 415/571-5100, $99.** If you have more than 8MB of RAM, you can use some of it as a RAM disk, speeding up disk-based operations, with this inexpensive utility. Nov 94

★★★★ **Norton DiskDoublerPro 1.1, Symantec Corp., 503/334-6054, $109.** Utility collection includes DiskDoubler, AutoDoubler, and CopyDoubler. Because of its ease of use, the product is a good choice for beginners. Feb 95

★★★ **Norton Utilities for Macintosh 3.1, Symantec Corp., 503/334-6054, $149.95.** Data-protection and -recovery utility collection is leaner, meaner, and faster than ever before, but it's also surprisingly uneven. While Disk Doctor leads the pack for disk-repair utilities, the back-up module is weak. Feb 95

★★★★ **Now Utilities 5.0, Now Software, 503/274-2800, $89.** Three of the modules of this fine-tuned, interlocking utility set—Now FolderMenus, Now Menus, and Now SuperBoomerang—are almost indispensable, and the other six are well worth considering. Jan 95

★★★ **Open Sesame 1.02 (1.1), Charles River Analytics, 617/491-3474, $99.** Utility automates Finder operations without macros or scripts. People with strict work habits are more likely to find its suggestions worthwhile than are those who don't follow a routine. May 94

★★★ **OptiMem 1.4.1 (1.5.6f), Jump Development Group, 412/681-2692, $129.** Systemwide memory manager monitors RAM use and allocates RAM where it's needed. Mar 94

★★★ **Peirce Print Tools 1.0, Peirce Software, 408/244-6554, $129.** Nine handy printing utilities work with QuickDraw GX. Most of the modules are useful, but not all are must-haves. Jan 95

★★★ **PopupFolder 1.0 (1.5), Inline Software, 617/935-1515, $59.95.** Finder utility is handy and easy to use, but sometimes sluggish. Aug 94

★★★★ **PowerAgent 1.1, SouthBeach Software Corp., 305/858-8416, $159.** You can revolutionize your Macintosh work with this agent program that manages scripts. It provides excellent support for FileMaker Pro. Nov 94

★★★★ **PowerMerge 2.0, Leader Technologies, 714/757-1787, $129.** Powerful file-management tool helps you keep individual files, folders, or entire volumes organized and up-to-date. This version lets you compare and launch documents, rename files, trash superfluous files, and lots more. Aug 94

★★★ **ProFiles 1.0, Dayna Communications, 801/269-7200, $129.** Unusual new utility lets you group related files and folders for quick access and actions such as making aliases, copying, turning sharing on and off, and more. The recommended RAM allocation of 1MB may be a problem for computers with limited memory. Aug 94

★★★★ **QuicKeys 3.0, CE Software, 515/221-1801, $139.** The simple, unintimidating interface of this macro-building utility allows you to build a set of useful shortcuts quickly. Mar 94

★★★★ **RAM Doubler 1.0.1 (1.5), Connectix Corp., 415/571-5100, $99.** Inexpensive system extension doubles available RAM for many Mac users. There are a number of requirements, however, including System 7, 4MB of physical RAM, and a 68030 board. May 94

★★★★ **SAM 3.5.8 (4.0), Symantec Corp., 503/334-6054, $99.** Efficient, thorough virus-protec-

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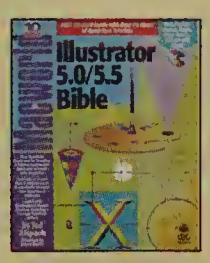

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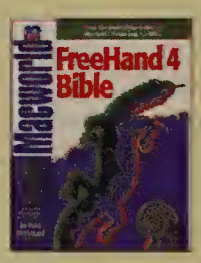

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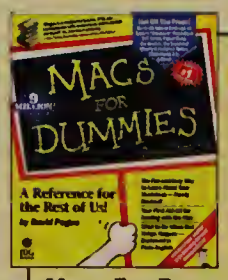

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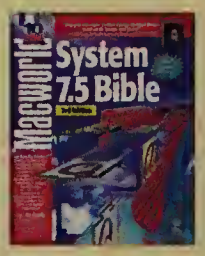

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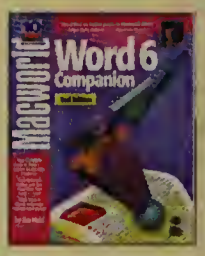

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Star Ratings

tion software slows down system start-up and application launching, but this program is a worthwhile investment for anyone who exchanges or downloads files. Mar 94

★★ **SCSI Director Pro 3.0.6, Transoft Corp., 805/565-5200, $99.** Utility provides simple, one-button hard disk formatting, but when it comes to doing some of the fancy tricks, the going gets rough and technical support costs $1.90 per minute. Sep 94

★★★★ **Square One 2.0, Binary Software, 310/449-1481, $74.** The slick design, flexibility, and straightforward interface of this file-launching utility make it a pleasure to use. Dec 94

★★★ **Stop & Go 4.0, Engram International, 415/455-1100, $69.99.** File-protection/relaunch utility uses a portion of your hard disk to save a snapshot of the data in your Mac's RAM. It's fast, and it relaunches files, applications, and extensions in a single, unified process, but it's unduly complicated. Oct 94

★★★ **Tempo II Plus 3.0.9 (3.0.9a), Affinity Microsystems, 303/442-4840, $179.95.** Very capable macro-creating utility may be daunting for novices but offers plenty of power for advanced users. Mar 94

★★★★ **TimesTwo 2.0, Golden Triangle Computers, 619/587-0110, $149.** This driver-level compression utility is transparent and robust. It caused no problems through a two-month course of testing. Mar 94

★★★ **UnderWare 1.0.1, Bit Jugglers, 415/968-3908, $59.95.** Inspired, silly fun for your Mac's desktop comes from a control panel that adds three features: a screen saver, desktop patterns, and animations that run on your desktop while you work. Jun 94

★★★★ **Virex 5.0 (5.03), Datawatch Corp., 919/549-0711, $99.95.** The extremely fast, trouble-free performance of this software makes the task of guarding against computer viruses almost painless. May 94

★★★★ **VirtualDisk 1.1a (2.0), Continuum Software, 206/695-8136, $79.** Rapid disk cataloging; fast, efficient label-printing; and an excellent disk-copy utility make this software a wonderful value. Jul 94

★★★ **Wiz Tools for PowerBook 1.2.2, ASD Software, 909/624-2594, $79.95.** The connectivity, file-synchronizing, and security features of this collection of PowerBook utilities are appealing, but the rest of the modules are also-rans. Jan 95

VERTICAL MARKETS

★★★ **Autoscore 1.0, Wildcat Canyon Software, 510/527-5155, $150.** Converting the human voice into MIDI note information is a challenging task. If you have the right music software, the right mike, and the right voice, this music-recognition software can actually pull it off. Feb 95

★★★ **Bird Brain 2.01, Ideaform, 515/472-7256, $125.** Database lets bird watchers record every sighting of every bird they have ever seen to create electronic life lists. Although it can be slow, it includes species names and other information. Jan 95

★★★★ **Claire, The Personal Music Coach 1.0.1, Opcode Systems, 415/856-3333, $129.95.** Musicianship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it's easy to learn. May 94

★★★ **ErgoKnowledge 1.0, Visionary Software, 503/246-6200, $395.** Despite a few shortcomings, this CD-ROM offers a good, basic review of office-computer ergonomics. Dec 94

★★★ **MayaCalc 2.3.1, Ecological Linguistics, 202/546-5862, $120.** 4th Dimension database alleviates much of the pain involved in working with the complex, multilayered Maya calendar. Although the design could be improved, it's a highly useful tool for both serious and casual Maya enthusiasts. Feb 95

★★★★ **Maya Hieroglyphic Fonts, Ecological Linguistics, 202/546-5862, $10 to $60 per set.** Although these fonts based on Mesoamerican hieroglyphic scripts are beautifully rendered, the character spacing is sometimes uneven. Feb 95

★★★★ **Mayo Clinic Family Health Book 1.2, IVI Publishing, 612/686-0779, $69.95.** Medical CD-ROM for home use deals with the full gamut of health-care topics, from AIDS to zygotes, although it doesn't include any reference to alternative therapies. Sep 94

★★★ **Mayo Clinic: The Total Heart 1.0, IVI Publishing, 612/686-0779, $59.95.** Cardiovascular health and related subjects are the topics of this medical CD-ROM for home use. Although it makes liberal use of drawings, photographs, and animations, video sequences would have been more effective. Sep 94

★★★ **Medical HouseCall 1.0, Applied Medical Informatics, 801/464-6200, $99.95.** Interactive medical guide is a painless way for people to learn about diseases, tests, and therapies. Although it's easy to use and interesting, some of the medical images were incorrectly labeled. Feb 95

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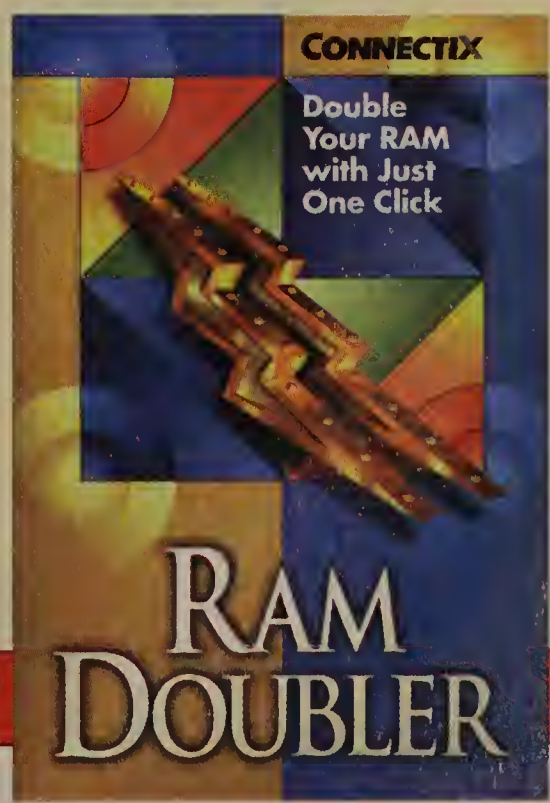

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★★★ **MusicTime 2.0, Passport Designs, 415/726-0280, $149 to $249.** Music-notation program is geared for hobbyists and students. If your needs aren't complex, it may fit the bill, at a great price. Oct 94

★★★★ **Practica Musica 3.0, Ars Nova Software, 206/889-0927, $140.** Music-teaching program, with emphasis on sight-reading and ear-training techniques, shines as a smart, infinitely patient personal music coach in the classroom. Jan 95

★★★ **SAM-CD, Scientific American Medicine, 212/754-0550, $395.** Despite a few shortcomings, this medical reference work—a popular series of publications covering topics in clinical medicine—should prove a worthwhile addition to any medical library. Sep 94

★★★★ **WillMaker 5.0, Nolo Press, 510/549-1976, $69.95.** Legal software quickly and easily automates the creation of wills, health-care directives and proxies, and final-arrangements documents. It offers excellent supporting explanations and background. Jun 94

WRITING TOOLS

★★★ **Grammatik 6 for Macintosh, WordPerfect Corp., 801/225-5000, $49.95.** The low price, pleasant interface, and improved accuracy of this grammar checker make it worthwhile for a large number of quality-driven writers. It still misses some errors. Feb 95

★★★★ **MacWrite Pro 1.5 (1.5 v2), Claris Corp., 408/727-8227, $249.** The clean, uncluttered interface of this word processor is one of its major assets. This upgrade adds support for AppleScript and more. May 94

★★★ **Microsoft Word 6.0, Microsoft Corp., 206/882-8080, $329.** If you can put this word processor's new features—including cross-referencing, AutoText, automatic numbering, macros, and more—to work and you have a Quadra 650 or faster Mac, take the plunge. If you have a slower 68040 Mac, think twice; and if you have a 68030 Mac, don't even think about it. Feb 95

★★★★ **OmniPage Professional 5.0, Caere Corp., 408/395-7000, $695.** In a historic first for OCR, this Power Mac software has an accuracy of 100 percent on good text samples. It does still make occasional baffling minor errors on real-world documents. Nov 94

★ **The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext.7370, $895.** CD-ROM dictionary contains half a million words, but the flaws, omissions, and unreliability are unbearable. Apr 94

★★★ **Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, $179.** Dictionary on CD-ROM works within any program and is good at guessing misspelled words. Although some functions don't work reliably, the quality and design of the software are good. May 94

★★★ **TextBridge 2.0, Xerox Imaging Systems, 508/977-2000, $99.** Optical character recognition software is impressive on good documents and can be trained and automated. You won't find that anywhere else at this price. Sep 94

★★★★ **WordPerfect for Macintosh 3.0 (3.0a), WordPerfect Corp., 801/225-5000, $495.** The innovative interface of this word processor uses context-sensitive button bars and expandable rulers to make innumerable features accessible with a click of the mouse. It's an accomplishment in ease of use. Mar 94

★★★★ **WriteNow 4.0.1, WordStar International, 617/494-1200, $119.95.** Tidy word processor's conservative use of memory (the application fits into a dainty 600K partition) and graceful interface will continue to win it fans. Jun 94

★★★ **Writing Coach 1.0, WritePlace Software, 503/484-6380, $89.** If you'd like help with your writing, this writing-skills tutorial could be a great investment. Skillfully worded worksheets assist with planning, organizing, and revising. Dec 94

Hardware

INPUT DEVICES

★★★ **DrawingSlate, CalComp Digitizer Division, 714/821-2000, $395.** Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. Jun 94

★★★ **Ear Phone Streamline AV, Jabra Corp., 619/622-0764, $169.** As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—this telephone/speech-recognition earpiece is a winner. Its biggest drawback is that you can't hear other Mac sounds when it's plugged in. Jul 94

★★★★ **FlightStick Pro for Macintosh, CH Products, 619/598-2518, $129.95.** The authentic look and feel of this joystick, along with well-conceived

continues

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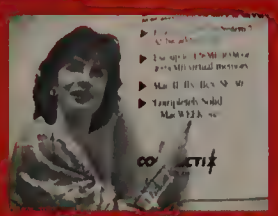
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Circle 191 on reader service card

Star Ratings

software, make it a nearly perfect desktop pilot's companion. Dec 94

★★★★ **Mac Keyboard Deluxe, MicroSpeed, 510/490-1403, $125.** If you're in the market for a new or replacement keyboard, this one, which is both smaller and lighter than Apple's Extended Keyboard, is worth considering. It has four ADB ports. Nov 94

★★★ **PenDirect ADB, FTG Data Systems, 714/995-3900, $398.** Input device lets you manipulate items on the Macintosh screen using a special stylus called a light pen. It works well, although it seems ergonomically inferior to a mouse for routine tasks. Mar 94

★★★ **Wacom UD-1212R, Wacom Technology Corp., 206/750-8882, $749.** Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it's incompatible with AppleTalk and AppleTalk Remote. May 94

MISCELLANEOUS HARDWARE

★★★★ **AirNote 1.0, Notable Technologies, 510/208-4400, $349.** Remote-messaging service lets you originate alphanumeric paging messages from your computer. It's a handy way to get into paging. Dec 94

★★ **G-Vox, Lyrrus, 215/922-0880, $399.** Hardware-software guitar-instruction package lets your Mac "hear" the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. Apr 94

★★★★ **IX-4015 Color Image Scanner, Canon Computer Systems, 714/438-3000, $1169.** The price of this color flatbed scanner is competitive, and its speed and excellent bundled software make it easy to use and a good choice for the small office. Jul 94

★★ **Macintosh TV, Apple Computer, 408/996-1010, $2079.** As a computer, this combination computer-television-CD player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. Apr 94

★★★★ **MultiSpin 4Xe, NEC Technologies, 708/860-9500, $515.** With its competitive price, free tech support, and two-year warranty, this quad-speed CD-ROM player is ready to race. Feb 95

★★★★ **Photo Engine, Radius, 408/541-6100, $1099.** Photoshop-acceleration hardware's suite of four 66MHz 32-bit DSP chips offers sufficient processing power to speed up 25 Photoshop functions on the most sophisticated systems, including Power Macs. Feb 95

★★★ **RCD-202, Pinnacle Micro, 714/727-3300, $2495.** Writable CD-ROM drive is good for archiving data simply and inexpensively, but it's incompatible with many hard drives. Mar 94

★★★★ **SCSI Sentry, APS Technologies, 816/483-6100, $99.** Although the price of this terminator may seem steep, this device may well be the cure for SCSI woes. Our reviewer heartily recommends it. Sep 94

★★★★ **ThinPack, VST Power Systems, 508/287-4600, $199.95.** External battery pack for PowerBooks is compact, with a lightweight design. Mar 94

★★★★ **TurboDialer, Advanced Software, 408/733-2364, $69.95.** Automatic telephone dialer is a well-executed product, except for occasional computer noise that seeps into phone conversations. Jul 94

★★★★ **Vivace, Coda Music Technology, 612/937-9611, $2295.** As an intelligent and endlessly patient accompanist, this music study system for wind instruments may be the best thing that's happened to learning wind literature since the metronome. Jan 95

★★★★ **Yamaha YST-M10 Powered Monitor Speakers, Yamaha, 714/522-9240, $149.95.** Powered speakers have a good balanced sound and a great volume range at an outstanding price. Apr 94

MODEMS/NETWORK HARDWARE

★★ **Cooperative Adapter, Photonics Corp., 408/955-7930, $349.** The high cost of each unit, the limitations and restrictions inherent in diffuse infrared, and the low cost of traditional LocalTalk make this infrared network interface an expensive niche product. Dec 94

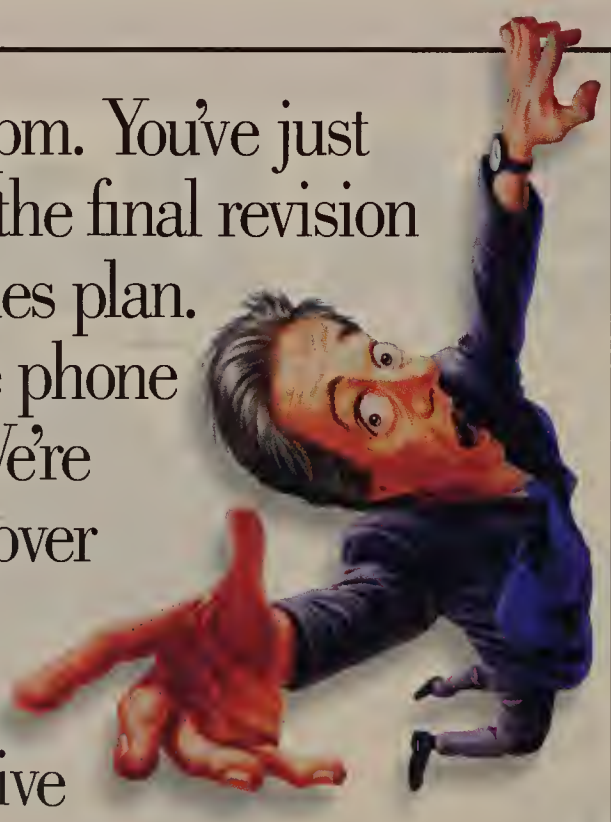
★★★★ **Cypress PhonePro 1.2 (1.5), Cypress Research Corp., 408/752-2700, $349 to $950.** By improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope. May 94

★★★ **DaynaPort Pocket SCSI/Link, Dayna Communications, 801/269-7200, $299 to $369.** Inexpensive, lightweight SCSI-to-Ethernet connector works with both desktop Macs and PowerBooks and can use the Mac's ADB port as a power source. Nov 94

★★★★★ **EtherWave, Farallon Computing, 510/814-5000, $129.** Instead of providing only one 10BaseT twisted-pair jack, this Ethernet transceiver includes a second jack that lets you daisy-chain to another device through an additional 10BaseT line. May 94

★★★ **FastSwitch 10, Grand Junction Net-**

It's 3:50 pm. You've just finished the final revision to the sales plan. Then the phone rings. "We're sending over 10 new pages of competitive info." Click. Good thing they lock the windows on this floor. You have to get it into the plan by the end of the day. What now?



You think she's finishing the proposal. She thinks you are. Surprise, neither one of you is. And it's 4 hours before the grant committee meets. Let's see, 16 new pages of data, 11 article reviews, 3,600 words sent by your partners in Istanbul. Who can type faster? What now?

works, 510/252-0726, $6250. Switched Ethernet hub is a great solution for networks that handle large amounts of data traded peer-to-peer, but if your network consists of E-mail and a file server, you probably won't see much benefit in stepping up to switched Ethernet. Dec 94

★★★ **OneWorld Fax, Global Village Communication, 415/390-8200, $999.** Easy-to-use network fax product lets an office share fax-sending resources without dedicating a hard drive and CPU; however, it can't receive faxes and can't queue more than one fax document at a time from a single CPU. Aug 94

★★★ **Pocket EtherTalk Adapter, Xircom, 818/878-7600, $349 to 399.** All-in-one SCSI-to-Ethernet connector is lightweight and works with desktop Macs and PowerBooks. Nov 94

★★★★ **PowerPort Mercury/PB 500 Series, Global Village Communication, 415/390-8200, $399.** Top-notch fax modem is capable of exemplary fax and data communications performance. Nov 94

★★★ **Spectra-Com P192mx, Bay Connection, 408/270-8070, $199.95.** If you must have absolute portability and AC power isn't available, this pocket data/fax modem can do the job. It's not that much smaller than a regular desktop modem, however. Oct 94

★★★★ **SupraFaxModem 288, Supra Corp., 503/967-2410, $329.95.** This 28,800-bps fax modem is a very good performer, and the price isn't terribly steep. Combined with fast, stable fax software and a good terminal program, it's hard to beat. Aug 94

★★★ **Watermark Message Central 2.0.2, High Tide Software, 510/704-9927, $499.** If you're willing to put in a lot of effort, you'll find this highly sophisticated voice-mail system supremely flexible. It includes a specially modified modem with voice chip, as well as fax software and telecommunications software. Jul 94

PRINTERS

★★ **Brother HJ-400, Brother International, 908/356-8880, $369.** Compact, 360-dpi ink-jet printer is fairly slow; doesn't allow background printing. May 94

★★★★ **Color StyleWriter Pro, Apple Computer, 408/996-1010, $629.** Color printer represents one of the best values in the inexpensive color-printing market. It's fast and produces nice-looking output. Sep 94

★★★★ **DeskWriter 310, Hewlett-Packard, 800/752-0900, $379 to $455.** Versatile, low-cost ink-jet printer is a 4.3-pound, battery-powered portable. With its 60-page sheet feeder, it's also a great desktop printer; and with a $49 color print cartridge, it offers inexpensive three-color printing. Mar 94

★★★ **HP LaserJet 4ML, Hewlett-Packard, 800/752-0900, $1279.** Primarily for those of you who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic port and language switching, and is a good buy. May 94

★★★★★ **LaserWriter Select 360, Apple Computer, 408/996-1010, $1599.** Low-cost, high-performance, 10-ppm printer is perfect for small LocalTalk or mixed networks. For bigger networks, consider buying more than one; they're more cost-effective than a 20-ppm printer. Apr 94

★★ **Notebook Printer II, Citizen America, 310/453-0614, $399.** If weight and size are your biggest concerns in choosing a portable printer, this thermal-fusion printer may be a good choice. If speed is at all an issue, however, other options may be preferable. Jun 94

★★★★ **Personal LaserWriter 320, Apple Computer, 408/996-1010, $959.** Low price, good speed, and PostScript Level 2 support outweigh the small inconveniences of this 300-dpi printer. May 94

★★★★ **PowerPrint 2.5, GDT Softworks, 604/291-9121, $149.** Ingenious hardware-software combo lets you print from your Mac to almost any PC printer. It supports over 1000 printers, ranging from aging dot matrix models to the newer color ink-jet and laser printers. Sep 94

★★★ **PrimeraPro, Fargo Electronics, 612/941-9470, $1895.** The photo-realistic output of this thermal-wax and dye-sublimation printer beats that of any other printer in the price range. But with expensive consumables and slow print time, it's best suited for routine thermal-wax use and occasional dye-sub work. Jan 95

★★★ **P-Touch PC, Brother International Corp., 908/356-8880, ext. 4307, $449.95.** Versatile label printer is easy to set up and use, and produces high-quality output. The cost per label is high, though, and the documentation is weak. Sep 94

★★ **QMS ColorScript Laser 1000, QMS, 205/633-4300, $7999.** Color laser printer succeeds in combining the versatility of monochrome laser printing with attention-getting color, but if you don't need to chase rainbows right away, you might wait and see if competition drives capabilities up. Jul 94

★★★ **Silentwriter 640, NEC Technologies, 508/264-8000, $825.** With 3MB of RAM, PostScript

continues

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Level 2 support, and a 6-ppm engine, this printer is a capable performer. Generally, it represents hassle-free printing, but it doesn't handle single sheets of paper well. Jun 94

★★★ **Smart Label Printer Pro, Seiko Instruments, 408/922-5900, $299.95.** If you need to print only a few labels at a time, this label printer may be an expensive but good choice. May 94

SYSTEMS/STORAGE

★★★★ **Alacrity PM 6100, KS Labs, 614/374-5665, $165.** Installing a clock booster is the quickest, easiest, and cheapest way to extract more power from Apple's entry-level Power Mac. Oct 94

★★★ **Conley SR2 RAID System, Conley Corp., 212/682-0162, $25,335.** While RAID technology is typically praised for its fault-tolerance rather than its speed, this high-performance storage system proves that you can have both. For critical tasks requiring redundancy and round-the-clock operation, this is one of the best Mac RAID systems shipping. Sep 94

★★★ **EtherDock, E-Machines, 408/541-6100, $699.** Heavy-duty Duo docking option is equipped with a full set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection. May 94

★★★ **Joule System, La Cie, 503/520-9000, price varies by component.** Plug-and-play tower lets you stack drives—including hard drives, removable media, and other modules—atop a base unit, making it easy to buy extra storage or swap modules with other Joule towers. Joule drive prices are generally slightly higher than for comparable drives, however. Feb 95

★★★★ **LC 575, Apple Computer, 408/996-1010, $1699.** For students who want the convenience of having everything integrated into one case, this 33MHz 68040 system is a good choice. Jun 94

★★★ **Newton MessagePad 110, Apple Computer, 408/996-1010, $599.** This is the personal digital assistant that Apple should have shipped in August 1993, with improved handwriting recognition, including deferred and letter-by-letter recognition. It also has more memory, longer battery life, and a more efficient design. Aug 94

★★★★ **OrangePC Model 200 Series, Orange Micro, 714/779-2772, $1139 to $3237.** If your goal is to get a Mac that runs Windows as fast as a PC, you can't get there from here. If your goal is to get business-level performance for day-in, day-out use, these PC coprocessor cards are probably your best choice. Aug 94

★★★★ **PLI Infinity 270 Turbo, PLI, 510/657-2211, $651.** This 270MB SyQuest drive is fast, reliable, and a very good product. The cost of the medium is competitive with that of optical drives. Sep 94

★★ **PowerBook 150, Apple Computer, 408/996-1010, $1449.** Fast, lightweight portable is minimalist in the extreme, with no video-out, ADB, Ethernet, or microphone. Unfortunately, the price is less minimalist, and most budget-conscious shoppers would be better off buying a used or discontinued model. Dec 94

★★★ **PowerBook 540c, Apple Computer, 408/996-1010, $4839.** The prestige PowerBook du jour, this sleek, curvy and futuristic-looking notebook makes a good computer for both on-the-road and in-the-office use. Its nonstandard battery, memory, and Ethernet ports are not ideal features, however. Oct 94

★★★★ **PowerBook Duo 280c, Apple Computer, 408/996-1010, $3759.** If you travel, this notebook computer is the best Mac to get. It offers close to the power of a Quadra 650 in a subnotebook. Oct 94

★★ **PowerBook Duo Dock II, Apple Computer, 408/996-1010, $969.** Apple has added Ethernet to this full-featured docking station, but installing NuBus cards is still absurdly difficult. If you don't need NuBus expansion, consider other options. Oct 94

★★★★ **Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model $1819.** Given its price and performance, the 6100/60 is hard to resist. This system will give you power to spare. Jun 94

★★★★★ **Power Macintosh 7100/66, Apple Computer, 408/996-1010, $2899.** Midrange Power Mac makes an outstanding workstation whose power should last for several years. The price is nothing to take lightly, but this system delivers every dollar's worth. Aug 94

★★★★ **Power Macintosh 8100/80, Apple Computer, 408/996-1010, $4249.** While this system doesn't quite offer the excellent price/performance ratio of the other available Power Macs, you should consider it if you're a high-end user moving your work over to RISC-based computing. Aug 94

★★★ **Power Macintosh Upgrade Card, Apple Computer, 408/996-1010, $699.** Current 33MHz 040 machines will get the best bang for the buck with this card, which is a less expensive upgrade path than a standard motherboard replacement. However, other Macs won't realize as much of a performance gain. Oct 94

★★★★ **Quadra 605, Apple Computer, 408/**

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996-1010, 4/80 $979. The performance and price of this 040-based machine match those of a standard entry-level 486SX-based Windows PC. Mar 94

★★★★ **Quadra 630, Apple Computer, 408/996-1010, $1279.** Fast, inexpensive, expandable 33MHz 68040 machine may be the last 680X0-based desktop Macintosh, but it's one of the best entry-level Macs ever. Nov 94

★★★ **SCSI MicroDock, Newer Technology, 316/685-4904, $175.** Tiny Duo docking station is just under 4½ ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful. May 94

★★★★ **SledgeHammer2000FMF, FWB, 415/474-8055, $3179.** RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. Apr 94

VIDEO/DISPLAY

★★★ **Apple Macintosh Display Card 24AC, Apple Computer, 408/996-1010, $1579.** 24-bit accelerated graphics card offers a satisfactory price/performance ratio, although it can't switch resolutions from the keyboard. Oct 94

★★★★ **Apple Multiple Scan 15 Display, Apple Computer, 408/996-1010, $509.** This 15-inch tridot monitor provides a sharp image but reflects some glare. The built-in stereo speakers reproduce sound nicely and are a benefit for CD-ROM users. Feb 95

★★★ **Apple QuickTake 100 for Macintosh, Apple Computer, 408/996-1010, $749.** If you're in the market for a medium-quality, digital color camera that costs less than $1000, this is the best deal around. But if you're not in a hurry, you may want to wait until some of the camera's more obvious problems, such as its fixed-focus lens and lack of a zoom option, are ironed out. Jul 94

★★★★ **FlexCam, VideoLabs, 612/988-0055, $595.** Small, unobtrusive desktop video camera has a flexible gooseneck for positioning. Dec 94

★★★ **Intellicolor Display/20, Radius, 408/434-1010, $2399.** Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value. Apr 94

★★★ **L-TV Portable, Focus Enhancements, 617/938-8088, $299.** Sturdy, inexpensive, external TV-converter plugs into your Mac and converts video output to NTSC. It provided a crisp, clean image, but mild flickering and conspicuous shimmers were persistent. Aug 94

★★★ **L-TV Pro NuBus, Focus Enhancements, 617/938-8088, $399.99.** NuBus card converts your Mac's RGB video signal to NTSC so you can use your Mac with a TV or VCR. It supports a wide range of Macs, but the image has some flicker and distortion, despite flicker-filtering software. Aug 94

★★★★ **Multiscan 15sf, Sony Computer Peripheral Products, 408/432-1090, $569.95.** Trinitron monitor has a flat screen that displays sharp, bright, and accurate images. With good antiglare coating and adjustable image tilt, it's worth looking at. Feb 95

★★★★ **MultiSync 3V Monitor, NEC Technologies, 708/860-9500, $495.** With a bright display and great image quality, this monitor delivers a fine picture at a moderate price. Feb 95

★★★ **The Presenter Plus Mac/PC, Consumer Technology Northwest, 503/643-1662, $429.** Small, external TV-converter supports output to television from most Macs with built-in video. It does a barely passable job of providing a stable image. Aug 94

★★★ **QA-350 LCD, Sharp Electronics Corp., 800/237-4277, $2495.** At less than half the cost of a typical active matrix LCD panel, this passive matrix projection panel offers an economical alternative for presenters who don't need multimedia capability. Jul 94

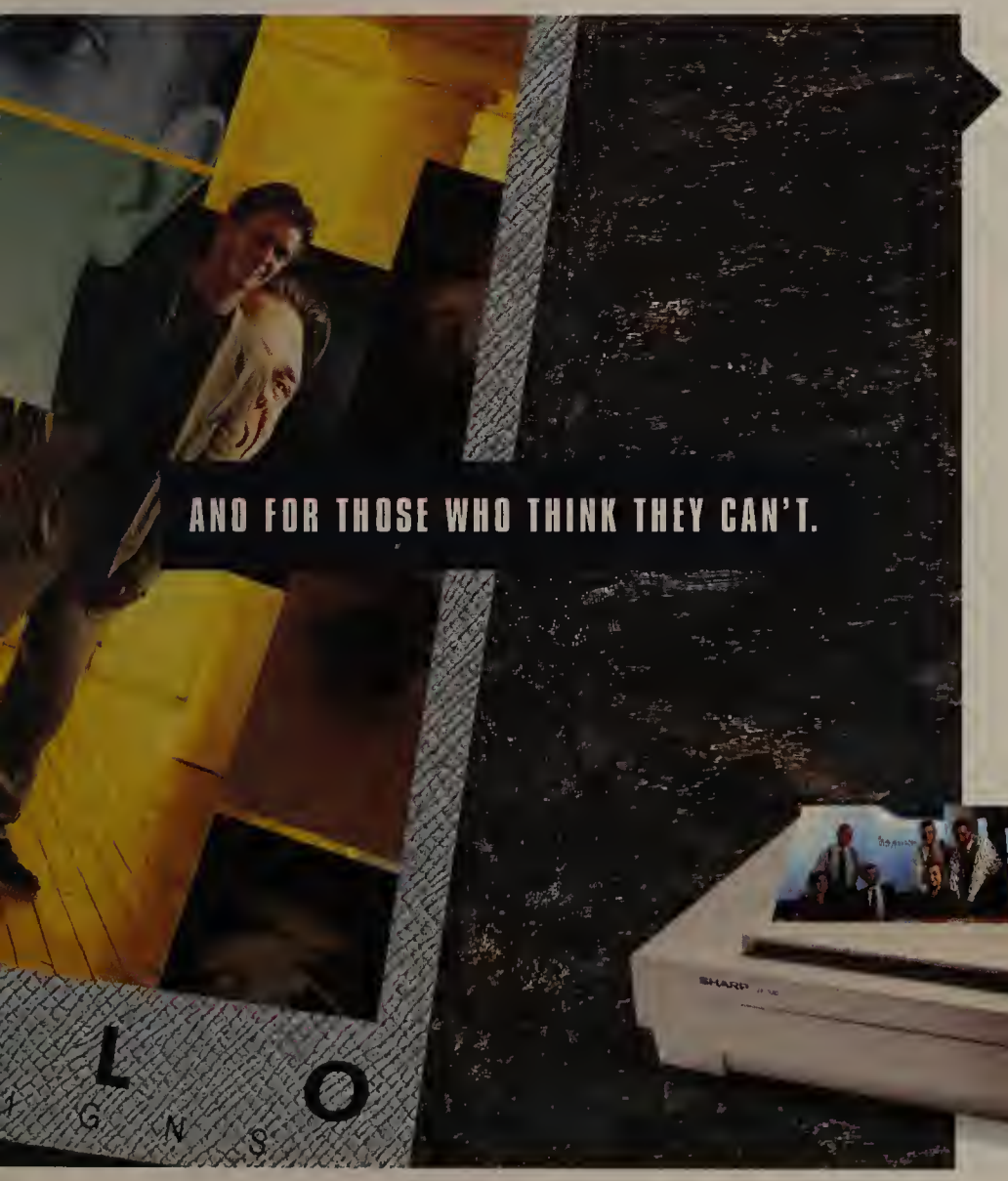
★★★★ **Radius LeMansGT, Radius, 408/434-1010, $2499.** Fast, 24-bit accelerated graphics card has automatic 30-bit CLUT calibration and can switch resolution on the fly via a pop-up menu. Oct 94

★★ **RasterOps Horizon 24, RasterOps, 408/562-4200, $1999.** This 13-inch 24-bit accelerated graphics card is slower than anticipated and overpriced. The ROM can, however, be upgraded via software. Oct 94

★★★ **Simply TV, E-Machines, 408/541-6100, $439.** Easy-to-install video card plugs snugly into a PDS slot, and allows you to use your Mac with a television for display. The image is impressively flicker-free, but the resolution is limited to 256 colors. Aug 94

★★★★ **SuperMac Spectrum Power•1152, SuperMac, 408/541-6100, $1399.** Fast, relatively inexpensive, 24-bit accelerated graphics card can switch resolutions from the keyboard and offers zoom and pan options. Oct 94

★★ **Tornado Graphics Card, Mirror Technologies, 612/832-5622, $699.** Inexpensive 24-bit accelerated graphics card has zoom and pan options but is relatively slow. Oct 94 m



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Selected and edited by Charles Barrett

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Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

American Heritage Talking Dictionary + ClipArt Library SoftKey International is including a $79.95 PC Paintbrush ClipArt Library of more than 3000 hand-drawn color images on CD-ROM free of charge with its $59.95 American Heritage Talking Dictionary, which pronounces 72,000 words and includes the entire contents of the 2140-page hardbound third edition on CD-ROM. Available for $29.95 by calling 800/843-2204. *Offer expires 2/28/95.*

Apple Color StyleWriter + StyleScript 1.1 + Type On Call 4.0 GDT Softworks is offering Adobe Systems' $99 Type On Call free to customers who purchase specially marked packages of its $149 StyleScript at the same time they buy an Apple Color StyleWriter Pro (Sep 94 ★★★★) or Color StyleWriter 2400 ink-jet printer. StyleScript enables StyleWriter users to produce PostScript Level 2 output, while Type On Call enables them to purchase typefaces on-demand from a locked CD containing more than 2000 Adobe typefaces. Available through MacConnection (800/800-0002), MacMall (800/222-2808), MacWarehouse (800/225-6227), MacsPlace (800/905-0009). *Offer expires 6/30/95.*

◀ **Canvas 3.5 + ◀ Pixar Typestry 2.1 + ◀ DeltaGraph Pro 3.5** Deneba Software is offering a Canvas Power Graphics bundle consisting of its $399 Canvas draw program (Jan 94 ★★★ for the 680X0 version) together with the $299 Pixar Typestry 3-D type-effects program (Feb 95 ★★★★) and DeltaPoint's $195 DeltaGraph Pro charting software (Apr 94 ★★★★ for version 3). Available from mail-order resellers and direct for $299.95. Call 800/733-6322 for more information. *Offer expires 3/31/95.*

◀ **EAsycolor 24/1360 Graphics Card + ◀ LogoMotion 1.5** EA Research is including a free copy of Specular International's $149 LogoMotion 3-D animation tool (Nov 94 ★★★★ for version 1.0) with its $1699 EAsycolor accelerated graphics card. The 24/1360 offers 24-bit color QuickDraw acceleration, Adobe Photoshop filter acceleration, and CMYK-to-RGB conversion. Call 800/681-6566 to order and for more information. *Offer expires 3/31/95.*

Enhanced NCSA Mosaic 1.0 + The Mosaic Handbook for the Macintosh O'Reilly & Associates is including the Spyglass version of NCSA Enhanced Mosaic on floppy disk free of charge with its $29.95 book for Internet beginners. Mosaic is used to navigate the Internet via the World Wide Web, and the Spyglass version is purported to fix problems found in public domain versions. Available direct (800/998-9938) or in bookstores.

Grolier Multimedia Encyclopedia + San Diego Zoo CD-ROM Grolier Electronic Publishing is including a free copy of Software Toolworks' $99.95 The San Diego Zoo Presents . . . The Animals on CD-ROM, which includes photos of over 200 animals, with every copy of its $149 encyclopedia on CD-ROM (Jul 94 ★★★★). The 1995 edition features over 8000 pictures, six hours of multimedia, and 33,000 articles. Estimated street price is $99.95. Call 800/285-4534 for more information.

In Control 3.0.4 + FastPace Instant Contact 1.0 + Quicken 5 Attain Corporation is offering a free copy of Intuit's $49.95 Quicken personal financial software (Feb 95 ★★★★) when you buy both Attain's $85 In Control personal planner and organizer (Oct 94 ★★★★) and its $79.99 FastPace Instant Contact contact manager (Jan 95 ★★★) for $99.95. Call 800/784-7388, ext. 9001, for more information and to order. *Offer expires 4/30/95.*

LaserWriter Select 360 + LaserWriter Bridge Apple Computer is including a free copy of LaserWriter Bridge—a custom implementation of Sonic Systems' $149 PowerBridge 3.0 utility—with its $1599 (company's estimated price) LaserWriter Select 360 printer (Apr 94 ★★★★★). LaserWriter Bridge connects the printer to the LocalTalk port of an Ethernet-attached Macintosh. Call 800/776-2333 for more information.

◀ **SuperCard 2.0 + ◀ Avid VideoShop 3.0 + ◀ Morph 2.5 + SoundMate 1.0** Allegiant Technologies is including the following free of charge with its $695 SuperCard authoring system (Feb 95 ★★★★ for version 1.7.1): Avid Technology's $395 QuickTime video-editing program (Feb 94 ★★★ for VideoShop 2.0); Gryphon Software's $149 warping and morphing software (Apr 94 ★★★★ for Morph 2.0); and Motion Works' SoundMate sound-editing utility. Available through mail-order resellers such as MacConnection (800/800-0002) and MacWarehouse (800/225-6227). *Offer good through at least 3/31/95.*

TrackBoard + QuicKeys 3.0.1 Datadesk is offering its new $169.95 TrackBoard—a full-function extended keyboard and three-button trackball combination—along with CE Software's $169 keyboard shortcut utility (Mar 94 ★★★★ for QuicKeys 3.0) for $139.95. Trackboard includes 15 user-definable function keys, and features both color-coded and rounded key tops. Call 800/248-4001 for more information. *Offer expires 6/30/95.*

VST Charger 500 Bundle + Claris Organizer 1.0 VST Power Systems is including Claris Corporation's $99 personal information manager (Jan 95 ★★★) free of charge with its VST Charger 500 bundles. VST's $179.95 bundle includes the Charger 500 external battery charger, which is also capable of simultaneously reconditioning and recalibrating two PowerBook 500–series Intelligence Batteries, as well as EMMpathy 2.0 diagnostic software for testing and repairing these batteries. The $259.95 bundle adds your choice of an AC or DC adapter (either the Apple AC Adapter or $99.95 VST Auto Adapter 500). Available from MacConnection (800/800-0002), MacMall (800/222-2808), MacWarehouse (800/225-6227), and The Mac Zone (800/248-0800).

COMPETITIVE UPGRADES

◀ **Adobe Illustrator 5.5** Adobe Systems is offering its $595 draw program (Sept 94 ★★★★) to registered users of Macromedia (formerly Aldus) FreeHand for $149. Call 800/521-1976 for more information. *Offer expires 2/28/95.*

Brainstorm Accelerators Brainstorm Products is offering an upgrade to its $149 Mac Plus accelerator or $199 Mac SE accelerator (Mar 95 ★★★★) for $99 to owners of any other Macintosh accelerator (even from companies no longer in business). Call 415/988-2900 for more information.

LAN Workplace for Macintosh 2.0 Novell is offering a $399 single-user license ($1995 for 10-user; $12,995 for 100-user) for this program to registered users of competitive products for $100 ($450 for 10-user; $1999 for 100-user). The latest version of Workplace provides transparent access to a variety of enterprise resources on TCP/IP-based networks and features drag-and-drop FTP file transfer for System 6 and 7 users. Call 800/638-9273 or 801/429-5588 for more information.

SPECIAL DISCOUNTS

Irma Suite for Macintosh DCA is offering a special introductory price of $250 on this $495 software product for accessing multiple mainframe, midrange, and Unix hosts from a single package. It supports Apple Remote Access and includes productivity tools such as DCA's QuickPads and a menu that is consistent across all host platforms. Call 800/348-3221 for more information. *Offer expires 3/31/95.*

Transparent Language 3.0 Transparent Language is offering its SpanishNow, FrenchNow, GermanNow, ItalianNow, and LatinNow foreign-language-learning packages (Oct 92 ★★★★ for version 1.04M) for $69.99 each on CD-ROM or $49.99 each on disk (regularly $129 and $99, respectively). Call 800/752-1767 to order and for more information. *Offer expires 5/31/95.* m

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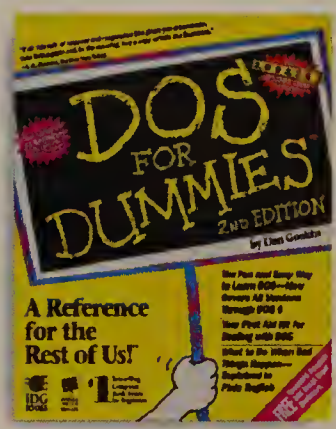

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Page No.	Advertiser	Reader Srvc. No.	Phone
26	Aatrix Software	159	800/426-0864
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216	Advance Business Center	225	800/723-8262
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38	Agfa	43	800/685-4271
80	Agfa	158	800/685-4271
12	Agio	—	800/688-2446
196-197	Alliance Peripheral Systems	62	800/874-1428
141-142	America OnLine	—	800/827-6364
104-105	American Power Conversion	72	800/788-2208
28	Anthro	—	800/325-3841
22-23	Apple Computer	—	—
84-85	Apple Computer	—	—
114-115	Apple Computer	—	—
56	Bose Corporation	—	800/444-BOSE
204-205	BottomLine Distribution	63	800/622-8721
174-175	Caere Corporation	69	—
160	CD ROM Expo	—	—
192-193	ClubMac	96	800/ CLUB MAC
13	Columbia House	125	—
45	CompuServe	66	800/848-8199
208-209	Computer Discount Warehouse	2	800/861-4CDW
171	Connectix	192	800/950-5880
173	Connectix	191	800/950-5880
139	Conner Perihperals	162	—
66	Corel Corporation	78	800/836-3729
206-207	CRA Systems Inc.	20	800/375-9000
72	CTX International	38	909/595-6146
40	Dantz Development	26	—
20	Datawatch	—	508/988-9700
8	DayStar Digital	7	800/532-7853
24	Delphi	173	800/695-4005
68	Delrina Corporation	137	800/631-8118
21	Deneba Software	57	800/733-6322
204-205	DGR Technologies	63	800/622-8721
210	DigiCore	269	800/858-4622
216	Digital Axis	83	800/747-7555
201	Direct Connections	121	800/572-4305
214	Directech	298	800/279-5520
247	Educorp	157	800/843-9497
10	Engineered Software	12	910/299-4843
30-31	Epson America	—	800/BUY-EPSON
194-195	Express Direct	81	800/765-0020
159	Fargo Electronics	172	800/327-4622
94-95	Fujitsu	202	800/831-4094
64	Graphsoft	46	410/290-5114
43	HSC Software	5	805/566-6200
12	IMAXIS	88	800/462-9470
82	Insignia Solutions	68	800/848-7677
62	Intuit	—	800/781-6999
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BC	Kensington Microware, Ltd.	—	800/535-4242
15-18	La Cie	52	800/999-1422
202-203	Mac Bargains	70	800/619-9091
128-129	MacConnection	—	800/800-3333
185-190	MacMall	131	800/222-2808
200	MacProducts	65	800/622-8721
47	Macromedia	86	800/326-2128
212-213	MacWarehouse	150	800/255-6227
178	Macworld Active Buyer Days	—	—
215	MegaHaus	245	800/786-1184
IFC-1	Microsoft	—	—
6-7	Microtek Lab, inc.	287	800/654-4160
146	Mobius Technologies	109	800/800-4334
29	Multimedia Design Co.	91	800/921-9493
2-3	NEC Technologies	15	800/NEC-INFO
60	NEC Technologies	14	800/NEC-INFO
IBC	NEC Technologies	16	800/NEC-INFO
27	Pinnacle Micro	115	800/553-7070
10	PowerTable/ScanCo	—	800/722-6263
191	ProDirect	135	800/524-9952
145	QMS	—	800/392-7559
246	Quality Computers	263	800/777-3642
150	Radius	—	—
9	RasterOps	124	800/SAY-COLOR
70	Seiko Instruments	93	800/888-0817
176-177	Sharp Electronics	257	800/BE-SHARP
166A-166B	Signature Software	300	800/925-8840
32	Specular International	41	800/433-7732
198-199	Spin Peripherals	248	800/215-9200
147	Statsoft	99	918/583-4149
78	Strata/StrataVision	223	800/869-6855
217	SuperMicro	126	800/352-3415
74	SyQuest	249	800/245-2278
103	Tektronix	143	800/835-6100
211	The Mac Zone	71	800/436-0606
76	Umax	196	800/201-8629
11	Visioneer	18	800/787-7007
14	VST Power Systems	73	508/287-4600
48-49	WordPerfect Corporation	—	800/526-7820
54	Xante Corporation	112	800/926-8839
120-121	Xerox Corporation	100	800/ASK-XEROX

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Page No.	Advertiser	Reader Srvc. No.
SOFTWARE		
BUSINESS		
26	Aatrix Software	159
58	AEC Software	203
68	Delrina Corporation	137
62	Intuit	—
93	Intuit	—
IFC-1	Microsoft	—
147	Statsoft	99
48-49	WordPerfect Corporation	—
CAD/CAM		
10	Engineered Software	12
64	Graphsoft	46
CD ROM		
66	Corel Corporation	78
247	Educorp	157
COMMUNICATION		
68	Delrina Corporation	137
EDUCATIONAL		
246	Quality Computers	263
FONTS		
166A-166B	Signature Software	300
GRAPHICS/DTP		
136	Adobe	231
66	Corel Corporation	78
21	Deneba Software	57
43	HSC Software	5
47	Macromedia	86
32	Specular International	41
78	Strata/StrataVision	223
MULTIMEDIA		
47	Macromedia	86
OCR		
174-175	Caere Corporation	69
PERSONAL		
62	Intuit	—
93	Intuit	—
STATISTICAL		
147	Statsoft	99
UTILITIES		
171	Connectix	192
82	Insignia Solutions	68
VERTICAL		
26	Aatrix Software	159
WORD PROCESSING		
48-49	WordPerfect Corporation	—
HARDWARE		
BOARDS		
146	Mobius Technologies	109
9	RasterOps	124
CD ROM		
13	Columbia House	125
247	Educorp	157
IBC	NEC Technologies	16
COMPUTER SYSTEMS		
84-85	Apple Computer	—
114-115	Apple Computer	—
206-207	CRA Systems Inc.	20
194-195	Express Direct	81
217	SuperMicro	126
DIGITIZERS/SCANNERS		
38	Agfa	43
80	Agfa	158
216	Digital Axis	83
30-31	Epson America	—
94-95	Fujitsu	202
12	IMAXIS	88
6-7	Microtek Lab, Inc.	287
176-177	Sharp Electronics	257
76	Umax	196
DISPLAY		
22-23	Apple Computer	—
206-207	CRA Systems Inc.	20
72	CTX International	38
216	Digital Axis	83
EXPANSIONS/UPGRADES		
8	DayStar Digital	7
FURNITURE		
12	Agio	—
HARD DISKS/STORAGE		
196-197	Alliance Peripheral Systems	62
204-205	BottomLine Distribution	63
192-193	ClubMac	96
204-205	DGR Technologies	63
201	Direct Connections	121
214	Directech	298
15-18	La Cie	52
200	MacProducts	65
215	MegaHaus	245
27	Pinnacle Micro	115
191	ProDirect	135
217	SuperMicro	126
74	SyQuest	249
INPUT DEVICES		
BC	Kensington Microware, Ltd.	—
11	Visioneer	18
MISCELLANEOUS		
104-105	American Power Conversion	72
MULTIMEDIA		
56	Bose Corporation	—
29	Multimedia Design Co.	91
POWERBOOK		
14	VST Power Systems	73
PRINTERS		
159	Fargo Electronics	172
2-3	NEC Technologies	15
60	NEC Technologies	14
145	QMS	—
70	Seiko Instruments	93
103	Tektronix	143
54	Xante Corporation	112
120-121	Xerox Corporation	100
SECURITY		
104-105	American Power Conversion	72
20	Datawatch	—
UTILITIES		
20	Datawatch	—
VIDEO		
173	Connectix	191
9	RasterOps	124
SERVICES		
ON LINE		
141-142	America OnLine	—
45	CompuServe	66
24	Delphi	173
TRADESHOWS/CONFERENCES		
160	CD ROM Expo	—
ACCESSORIES		
FURNITURE		
28	Anthro	—
10	PowerTable/ScanCo	—
MISCELLANEOUS		
10	PowerTable/ScanCo	—
MAIL ORDER		
216	Advance Business Center	225
196-197	Alliance Peripheral Systems	62
204-205	BottomLine Distribution	63
192-193	ClubMac	96
208-209	Computer Discount Warehouse	2
204-205	DGR Technologies	63
210	DigiCore	269
201	Direct Connections	121
214	Directech	298
194-195	Express Direct	81
202-203	Mac Bargains	70
128-129	MacConnection	—
185-190	MacMall	131
200	MacProducts	65
212-213	MacWarehouse	150
215	MegaHaus	245
191	ProDirect	135
246	Quality Computers	263
198-199	Spin Peripherals	248
211	The Mac Zone	71

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Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)? (Check one.)

- 01 ❑ 1000+
- 02 ❑ 999 - 100
- 03 ❑ 99 - 25
- 04 ❑ Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)

- 05 ❑ Apple Workgroup Servers/ Mac Quadra-series
- 06 ❑ Mac Centris-series/II-series/LC III/ Performa 600/450/SE 30
- 07 ❑ Mac LC/LC II/Performa 430/405/ 400/200/Classic-series/SE/Plus/ 512K/128K/Portable
- 08 ❑ Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work-site? (Check one.)

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/ or services? (Check one.)

	C	D
500+	❑ 09	❑ 15
499 - 100	❑ 10	❑ 16
99 - 50	❑ 11	❑ 17
49 - 10	❑ 12	❑ 18
9 - 1	❑ 13	❑ 19
None	❑ 14	❑ 20

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)

- 21 ❑ Initiate/Determine need for product/capabilities/features
- 22 ❑ Evaluate, recommend, or approve brands/models
- 23 ❑ Evaluate, recommend, or approve purchase source
- 24 ❑ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)

- 25 ❑ $1 million or more
- 26 ❑ $999,999 – $500,000
- 27 ❑ $499,999 – $100,000
- 28 ❑ $99,999 – $50,000
- 29 ❑ $49,999 – $10,000
- 30 ❑ Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

- 31 ❑ Business software (Word processing, spreadsheet, database, etc.)
- 32 ❑ Graphics/publishing software
- 33 ❑ Monitors/displays
- 34 ❑ Printers/scanners
- 35 ❑ Networking/communications hardware and/or software
- 36 ❑ Multimedia/AV hardware and/or software
- 37 ❑ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)

- 38 ❑ Computer Reseller/VAR/VAD
- 39 ❑ MIS/DP/IS/Network Management
- 40 ❑ Engineering
- 41 ❑ R&D/Scientific
- 42 ❑ Corporate/General Management
- 43 ❑ Accounting/Finance
- 44 ❑ Marketing/Sales/PR/ Communications
- 45 ❑ Art/Design/Creative Services

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1	2	3	4	5	151	152	153	154	155
6	7	8	9	10	156	157	158	159	160
11	12	13	14	15	161	162	163	164	165
16	17	18	19	20	166	167	168	169	170
21	22	23	24	25	171	172	173	174	175
26	27	28	29	30	176	177	178	179	180
31	32	33	34	35	181	182	183	184	185
36	37	38	39	40	186	187	188	189	190
41	42	43	44	45	191	192	193	194	195
46	47	48	49	50	196	197	198	199	200
51	52	53	54	55	201	202	203	204	205
56	57	58	59	60	206	207	208	209	210
61	62	63	64	65	211	212	213	214	215
66	67	68	69	70	216	217	218	219	220
71	72	73	74	75	221	222	223	224	225
76	77	78	79	80	226	227	228	229	230
81	82	83	84	85	231	232	233	234	235
86	87	88	89	90	236	237	238	239	240
91	92	93	94	95	241	242	243	244	245
96	97	98	99	100	246	247	248	249	250
101	102	103	104	105	251	252	253	254	255
106	107	108	109	110	256	257	258	259	260
111	112	113	114	115	261	262	263	264	265
116	117	118	119	120	266	267	268	269	270
121	122	123	124	125	271	272	273	274	275
126	127	128	129	130	276	277	278	279	280
131	132	133	134	135	281	282	283	284	285
136	137	138	139	140	286	287	288	289	290
141	142	143	144	145	291	292	293	294	295
146	147	148	149	150	296	297	298	299	300

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401	402	403	404	405	501	502	503	504	505
406	407	408	409	410	506	507	508	509	510
411	412	413	414	415	511	512	513	514	515
416	417	418	419	420	516	517	518	519	520
421	422	423	424	425	521	522	523	524	525
426	427	428	429	430	526	527	528	529	530
431	432	433	434	435	531	532	533	534	535
436	437	438	439	440	536	537	538	539	540
441	442	443	444	445	541	542	543	544	545
446	447	448	449	450	546	547	548	549	550
451	452	453	454	455	551	552	553	554	555
456	457	458	459	460	556	557	558	559	560
461	462	463	464	465	561	562	563	564	565
466	467	468	469	470	566	567	568	569	570
471	472	473	474	475	571	572	573	574	575
476	477	478	479	480	576	577	578	579	580
481	482	483	484	485	581	582	583	584	585
486	487	488	489	490	586	587	588	589	590
491	492	493	494	495	591	592	593	594	595
496	497	498	499	500	596	597	598	599	600

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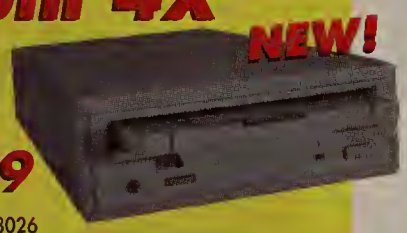

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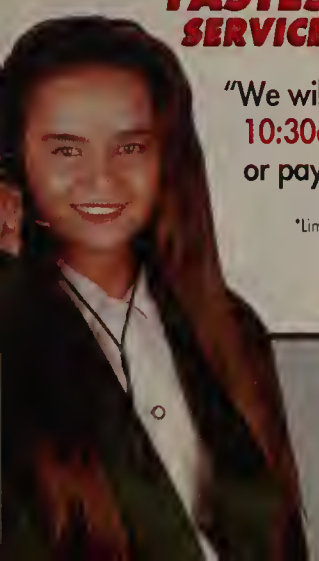

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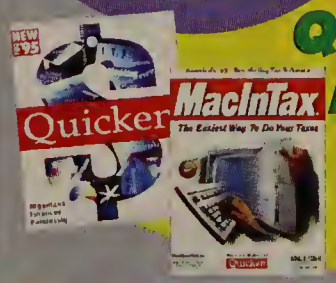

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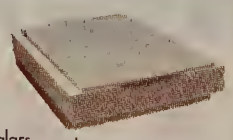

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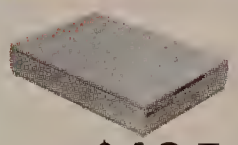

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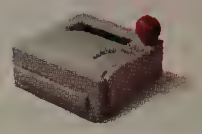

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4MB RAM

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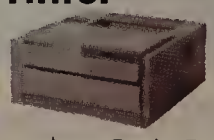

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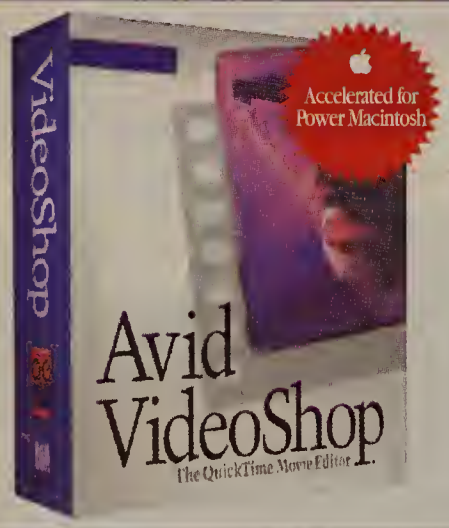

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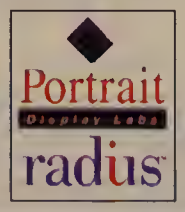

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- Supports color, grayscale, halftone, line art modes
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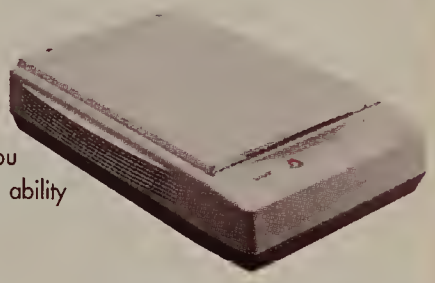
9600 dpi Color Scanner

This 24-bit, flatbed scanner gives you 600x1200dpi optical resolution and the ability to scan millions of colors

- Supports material up to 8"x14"
- 9600 dpi resolution through software
- 24-bit, 16.8 million colors
- Support color, gray, halftone, lineart modes
- Downloadable gamma curves
- Built-in interface
- Standard TWAIN
- Include Photoshop LE and OmniPage Direct



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ScanMaker IIHR

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- Optional transparency adapter and automatic document feeder

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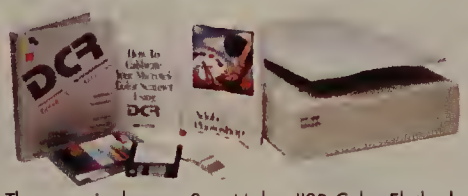
ScanMaker IISP



The new single-pass ScanMaker IISP Color Flatbed Scanner with DCR™, the most accurate color system calibration available for the desktop, is another price/performance breakthrough from Microtek. Accurate color calibration for more vibrant, saturated and true color which used to be only available at a premium price on high-end scanning equipment. It is also Apple® ColorSync™ compatible. Comes complete with Adobe Photoshop 3.0 LE and OmniPage Direct.

$747.99 #62974

ScanMaker II

This scanner uses a three-pass scanning method to capture full 24-bit color or 256 shades of grey. Features 300 dpi horizontal, 600 dpi vertical resolution, with a maximum of 1200dpi x 1200dpi through interpolation. Includes Adobe Photoshop 3.0 LE, OmniPage Direct and scan module with Automatic Contrast Control and Display Matching System, making it a snap to get great looking images on the first try.

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ScanMaker III

The ScanMaker III scans in 36-bit color, capturing images at up to 12 bits per RGB color channel. Scans up to 2400dpi for smoother, more precise color gradations, detailed highlights and rich shadows, accurate midtones and a full photographic dynamic range up to 3.4. Includes FULL version of Adobe Photoshop 3.0.

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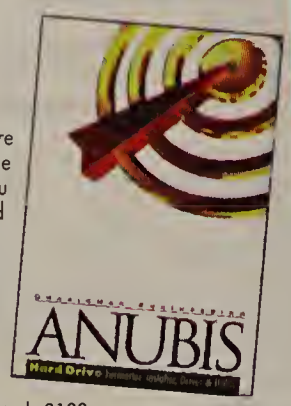

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Publisher: CharisMac

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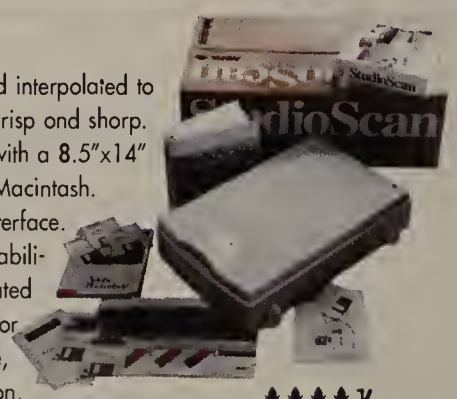
$99.99 #68191

Studio Scan II



With the true optical resolution of Studio Scan II at 400x800 and interpolated to 2400, image enlargements are possible, and printed results are crisp and sharp. Studio Scan II has 30 Bit Color Scanning and 10 Bit Grayscale, with a 8.5"x14" scanning area. A complete bundle of software is included for Macintosh. FotoSnap is a one-click, no-nonsense, best scan-time scanner interface. FotoLook provides the more adventurous with expert scanning capabilities. Color correct output from your monitor and printer is automated by FotoTune Light, which includes the industry standard IT8 color calibration chart. Adobe Photoshop 3.0LE completes the bundle, providing the facility for creative image manipulation. In addition, instant access to years of professional scanning experience is provided by Agfa's free fact-packed "Introduction to Digital Scanning" - it's a revelation!

★★★★½ MacUser June 1994

$869.99 #66017

Studio Scan II Transparency Adapter

Maximum transparency scanning area 8"x10"

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AGFA

Studio Scan

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RELISYS

AVEC 2400

Color Scanner

The Avec Calar 2400 is a scanner which maximizes the desktap personal camputer inta a warking imaging tool. It is a three pass design, capable af scanning an 8 1/2"x 14" area in 24-bit, 16.8 millian calars with a maximum resalutian af 2400 dpi. This translates inta 180,000 pixels per square inch, a true benefit far image scanning. Bundled with Adabe Phatashap LE, OmniPage Direct OCR saftware and Art Scan Prafessianal. The Avec 2400 has everything yau need in an entry level calar scanner with three times the specificatians af the campetitian at a lawer cast. SCSI-2 interface.

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RELI 2412 Mac/TE

Color Scanner with Transparency Adapter

The Reli 2412 Mac/TE is an excellent chaice far the desktap publisher. It is af a single pass design, capable af scanning a 24-bit 8 1/2"x 14", 16.8 millian calar image with a maximum resalutian af 2400 dpi. The 2412 Mac/TE maximum resalutian translates inta 360,000 pixels per square inch, which benefits anyane scanning calar images and transparencies. Bundled with Adabe Phatashap LE, OmniPage Direct OCR saftware, Kai's PawerTaals SE, Kai's PawerTools Tips and Tricks and ArtScan Prafessianal. Transparency adapter nat shawn.

$789.99 #66771

RELI 4816 Mac/TE

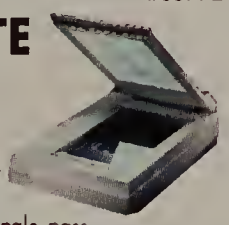
Color Scanner with Transparency Adapter

The Reli 4816 Mac/TE is an excellent chaice far desktap publishers and graphic artists. It is a single pass design capable af scanning a 24-bit 8 1/2"x14" 16.8 millian calar image with a maximum resalutian af 4800 dpi. The Reli 4816 Mac/TE maximum resalutian translates inta 1,440,000 pixels per square inch. Bundled with Adabe Phatashap LE, OmniPage Direct OCR saftware, Kai's PawerTaals SE, Kai's PawerTaals Tips and Tricks, ArtScan Prafessianal. Transparency adapter nat pictured.

$979.99 #66772

RELI 4830 Mac/TE

Color Scanner with Transparency Adapter

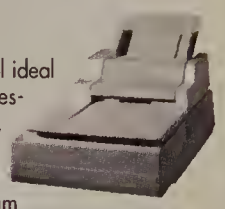


The Reli 4830 Mac/TE is an excellent chaice far desktap publishers and graphic artists requiring 30-bit calar. It is af a single pass design, capable af scanning a 11 1/2"x14" image with a maximum af 16.8 millions calars at a resalutian af up ta 4800dpi. The Reli 4830 Mac/TE maximum resalutian translates inta 640,000 pixels per square inch. Exclusive ta Reli 4830 is its transparency adapter with an LCD light saurce built in ta the scanner's caver, which pravides even mare flexibility far the graphics prafessianal. Bundled with Adabe Phatashap 3.0, OmniPage Direct OCR, Kai's PawerTaals and Kai's PawerTools Tips & Tricks and ArtScan Prafessianal. Transparency aptian nat shawn.

$1649.99 #67716

RELI 9624 Mac/TE

Professional Color Scanner with Transparency Adapter



The Reli 9624 Mac/TE is a scanning tool ideal far PrePress use and the graphics prafessianal. It is af a single pass design, capable af scanning a 24-bit, 16.8 millian calar image with a maximum af 9600dpi. The 9624 Mac/TE's maximum resalutian translates inta 1,400,000 pixels per square inch. Includes transparency adapter far up ta 8"x10" transparencies. Bundled with Adabe Phatashap 3.0 image pracessing, Omnipage Direct OCR saftware, Kai's PawerTaals, Kai's PawerTaals Tips & Tricks and ArtScan Prafessianal. Transparency aptian nat pictured. Dacument feeder pictured is aptianal.

$1949.99 #65710

RELI 9612 Mac/TE

Professional Color Scanner with Transparency Adapter

The Reli 9612 Mac/TE affers affers the extra pawer ideal far PrePress use and the graphics prafessianal. It is af a single pass design, capable af scanning a 24-bit, 8 1/2"x11 1/2", 16.8 millian calar image with aptical resalutian af 1200x600. Includes a transparency adapter far up ta 8"x10" transparencies. Bundled with Adabe Phatashap 3.0, OmniPage Direct OCR saftware, Kai's PawerTools, Kai's PawerTools Tips and Tricks and ArtScan Prafessianal.

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These are just a few af the delights to be discavered in "What's the Secret?", the first in a series af innavative programs from 3M Learning Saftware. Based an Newtan's Apple, the public television family show, "What's the Secret?" is an interactive quest into the everyday mysteries arand us. "What's the Secret?" turns your computer into a unique experimental laboratary. Explare the interconnected worlds af science and natare, chaasing your own paths as you leap from acaustics to medicine to history to math without ever losing your way. A variety af whimsical gadgets lets you control your interactians with animations, video, text and sound.

$49.99 #66500

Requires: Mocintosh 030 CPU, 25MHz or better (040 CPU, 33MHz recommended), 8MB RAM, Double speed CD-ROM player, 640x480 resolution and System 7.0+.

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Bring the Power in house!

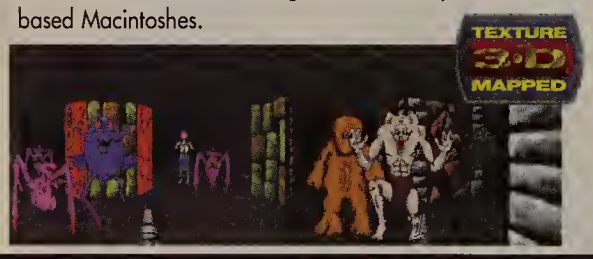
CD-R from 3M leads a new era in data recording, storage and distribution. CD-R offers high reliability, low error rates, random access to data, and the ability to store many different form of data such as audio, video, graphics and text. You can produce your own discs when you need them, in the quantities you desire right at your desktop. You are in complete control of the whole process. The CD-R supports both standard and double speed recording drives, so its possible to finish a disc in less than an hour. And they play in standard CD-ROM or CD Audio players. 3M CD-Rs look like traditional CD-ROMs except they are gold! Manufactured with five layers: a clear, polycarbonate substrate that forms the bulk of the disc, a recording layer, a gold reflector layer and a protective sealcoat. And like CD-ROM, once recorded, they are read-only media.

CDR 650/74 CD Recordable Disk, 74 minutes, 650MB ..... $15.99 #68189
CDR 550/63 CD Recordable Disk, 63 minutes, 550MB ..... $14.99 #68190

Pathways to Darkness

The closest thing to Virtual Reality ... Without a helmet!

You'll explore an ancient pyramid on your mission to save the world from a hostile alien demon. Explore miles of catacombs through a smooth scrolling, first-person interface. Beautifully rendered graphics and active panning stereo sound combine to make Pathways Into Darkness the closest thing to virtual reality without a helmet! Now runs native on RISC-based Macintoshes.



Winner 1993 MacWorld Game Hall of Fame!

$39.99 #62456

Marathon

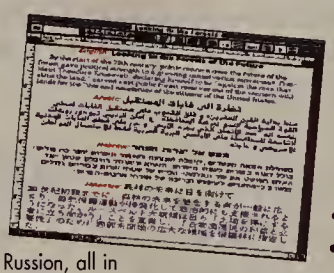
BUNGIE

From the makers of the award-winning Pathways Into Darkness comes the next step in 3D, texture-mapped action. Onboard the intergalactic colony ship Marathon things have gone horribly wrong. A science officer on the mission, you are the last hope for defending the ship as hostile and intelligent aliens prepare to destroy every living thing. A wide array of advanced weaponry and surrealistic settings provide a unique experience. Texture mapped floors and ceilings, 100's of miles of terrain over multiple elevations, all depicted in high resolution graphics. Functionally designed interface, and a digital soundtrack heighten the intensity. Networkable up to 8 players.

$39.99 #66562

Nisus Writer

Powerful Document Processing for the Macintosh



Nisus Writer is more than a word processor. It gives you more control over text editing with style sheets, tool bars, keyboard shortcuts, spelling verification, a thesaurus, mail merge and glossary. Language Key takes advantage of WordScript™ by allowing you to write in English and in many other languages, including Arabic, Hebrew, Japanese and Russian, all in the same document. Nisus makes switching languages as easy as choosing fonts, like no other program in the world. Plus, include graphics into your document with ease. A full graphics bar allows you to create simple or complex graphics in up to 256 colors. Nisus Writer, for many projects you'll never need a separate page layout or drawing application again. See, Hear and Speak your message with the capability to add movies within your documents and animate them with sound. Nisus Writer is everything you need in one outstanding application!!

Nisus Writer 4.0 ..... $249.99 #68187
Nisus Writer 4.0 with Language Key .. $299.99 #68195

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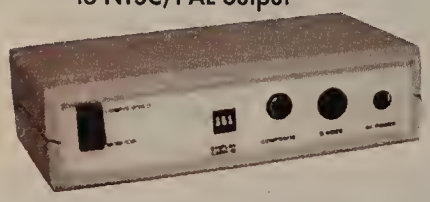
Converter for Macintosh® II RGB to NTSC/PAL output



The WTI-VideoMax™ allows users to create video tapes on standard formats such as VHS, 8mm, Hi-8, etc. Users can mix Macintosh computer graphics and video using standard off the shelf software and output presentations to video projectors, VCRs and large screens.

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Full color 35mm slide film scanner,2700 pixels per inch,maximum transfer rate of 1 MB/sec.,scans color or monochrome, positive or negative film, the only single pass scanner with LED illumination. A simple to use and economically priced product from Nikon.

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IDE Drives

NEW

NEC NEC NEC

Capacity	Model	Size	Access	Price
345MB	D3713	3.5"	12ms	$185
540MB	D3717	3.5"	12ms	$260

NEC drives include a 2 year warranty

MICROPOLIS MICROPOLIS

1.2GB	2210	3.5"	10ms	$585
1.7GB	2217	3.5"	10ms	$895

Micropolis drives include a 5 year(Advance Replacement)warranty

Seagate Seagate

214 MB	ST3243	3.5"	15ms	$165
260 MB	ST3290A	3.5"	15ms	$180
340 MB	ST3391A	3.5"	12ms	$205
420 MB	ST3491A	3.5"	12ms	$225
540 MB	ST5660A	3.5"	12ms	$295

Seagate drives include a 2 year warranty

Hard Drive Cabinets

Zero Footprint	$75
MicroCab	$89
Full Height	$139
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Two, four, six, and eight bay cabinets available. All cabinets come with a 25-50 pin Mac system cable and a power cable. 1 year warranty on all cabinets.

All prices are subject to change without notice. Refused orders are subject to a restocking fee. International customers pay all shipping charges. All shipping charges are non-refundable. To return merchandise call for an RMA number. All RMAs must be returned within 10 business days of issuance. All returns without an RMA number will not be accepted.

Hard Drives

Quantum Quantum Quantum

Quantum

Quantum hard drives are based on customer focused innovation, making Quantum a leading manufacturer of 2.5 inch and 3.5 inch high quality, high performance hard disk drives.

2 Year Warranty

5 Year Warranty

Lightning & Maverick Series

Capacity	Access	RPM	Cache	Int.	Ext.
170 MB	11 ms	4500	128K	$165	$225
270 MB	11 ms	4500	128K	185	245
365 MB	11 ms	4500	128K	205	265
540 MB	14 ms	4500	128K	245	305
730 MB	11 ms	4500	512K	305	365

Empire & Grand Prix Series

1080MB	10 ms	5400	512K	585	645
1440 MB	9.5 ms	5400	512K	755	815
2100 MB	9.5 ms	5400	512K	1005	1065
4200 MB	8.6 ms	7200	512K	2175	2235

Daytona Series Powerbook Drives

Capacity	Seek	Warranty	Int.	Ext.
256 MB	17ms	1 Year	275	375
514 MB	14ms	1 Year	445	545

MICROPOLIS MICROPOLIS

5 Year Warranty

Capacity	Size	Model	Access	RPM	Cache	Int.	Ext.
1.2 GB	3.5"	M4110	8 ms	5400	512K	$585	$645
1.7 GB	3.5"	M2217	10 ms	5400	512K	895	955
2.1 GB	3.5"	M4200	8.5 ms	7200	512K	1185	1245
3.6 GB	5.25"	M1936	11 ms	5400	256K	1750	1850
4.3 GB	3.5"	M3243	8.5 ms	7200	512K	2225	2285
9.0 GB	5.25"	M1991	12 ms	5400	512K	3345	3445

Direct to Disk Recording AV Drives

Active Termination

1.2 GB	3.5"	M4110AV	10 ms	5400	512K	$625	$685
1.7 GB	3.5"	M2217AV	10 ms	5400	512K	945	1005
3.6 GB	5.25"	M1936AV	11 ms	5400	512K	1845	1945
4.3 GB	3.5"	M3243AV	8.5 ms	7200	512K	2275	2335
9.0 GB	5.25"	M1991AV	12 ms	5400	512K	3395	3495

Seagate Seagate Seagate Seagate

5 Year Warranty

Capacity	Size	Model	Access	RPM	Cache	Int	Ext
1.2 GB	3.5"	ST31200N	10ms	5400	256K	$595	$655
1.9 GB	3.5"	Hawk 2	9ms	5400	512K	1095	1155
4.2 GB	3.5"	Hawk 4	9ms	5400	512K	2015	2075

Barracuda Drives - Great for your AV Needs

Active Termination

1.7 GB	3.5"	Barracuda 1	8ms	7200	1024K	1035	1095
2.4 GB	3.5"	Barracuda 2	8ms	7200	1024K	1225	1285
2.4 GB	3.5"	Barracuda 2W	8ms	7200	1024K	1345	1445
4.2 GB	3.5"	Barracuda 4	8ms	7200	1024K	2275	2335
4.2 GB	3.5"	Barracuda 4W	8ms	7200	1024K	Call	Call
9.0 GB	5.25"	ST 410800N	11ms	5400	512K	Call	Call

IBM Hard Drives

5 Year Warranty

IBM drives utilize IBM's advanced Magneto-Resistive (MR) head technology which increases the amount of data stored per disk surface and reduces the number of disks and heads making the IBM series more slim-lined and reliable.

Capacity	Seek	RPM	Int.	Ext.
270 MB	12 ms	4500	$180	$240
364 MB	12 ms	4500	210	270
540 MB	12 ms	4500	260	320
720 MB	12 ms	4500	355	415
1.0 GB	11 ms	5400	595	655
2.0 GB	9 ms	5400	1150	1210

HEWLETT PACKARD

Capacity	Model	Access	RPM	Warranty	Int.	Ext.
1.2 GB	C3323	9.5 ms	5400	5 Year	$625	$685
2.4 GB	C2490	8.5 ms	6400	5 Year	1150	1210

NEC

Capacity	Model	Access	RPM	Int.	Ext.
540 MB	D3817	12 ms	5400	$275	$335

All drives are tested and formatted with the latest SCSI manager 4.3 compatible software which is 100% PowerMac Compatible.

Look for the **ProCare** symbol

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Removable Storage

SyQuest SyQuest

Capacity	Model	Seek	RPM	Buffer	Int.	Ext.
88 MB	SQ5110C	20ms	3200	32K	305	365
105 MB	SQ3105	14.5ms	3600	64K	245	305
200 MB	SQ5200	18 ms	3200	64K	425	485
270 MB	SQ3270	13.5ms	3200	128K	425	485

Media

FEATURING SyQuest REMOVABLE TECHNOLOGY

Capacity	Model	Warranty	Price
44 MB	SQ400	5 year	$56
88 MB	SQ800	5 year	66
105 MB	SQ310	5 year	54
200 MB	SQ2000	5 year	78
270 MB	SQ327	5 year	64

CD ROM Drives by NEC

Model	Access	Transfer	Price
MultiSpin 2V	320ms	300Kb/sec	$245
MultiSpin 3Xp	240ms	500Kb/sec	$395
MultiSpin 4Xe	220ms	600Kb/sec	$495
PLEXTOR			
4 Plex QuadSpeed	235ms	600Kb/sec	$Call

Optical Drives

HEWLETT PACKARD

Capacity	Model	Access	RPM	Warranty	Int.	Ext.
1.3 GB	C1716T	23.5ms	2400	1 Year	$2235	$2295

FUJITSU DynaMO

Capacity	Model	Access	RPM	Warranty	Int.	Ext.
230 MB	DynaMo	30ms	3600	2 Year	N/A	$945

NEC

Capacity	Model	Transfer	RPM	Warranty	Int.	Ext.
1.3 GB	ODD-155	3.5MB/sec.	3000	5 Year	$2020	$2080

Tape Backup Drives

HEWLETT PACKARD

Capacity	Model	Transfer Rate	Media	Int.	Ext.
2.0 GB	35470	15 MB/min.	4mm	$835	$885
3-5 GB	35480	45 MB/min.	4mm	1039	1099
4-10 GB	1533A	60 MB/min.	4mm	1235	1295
20-50 GB	1553A Auto Tape Loader	60 MB/min.	4mm	3195	3295

Exabyte

2-5 GB	8205	263 KB/sec.	8mm	$1425	$1495
5-10 GB	8505	500 KB/sec.	8mm	2175	2275
7-14 GB	8505XL	500 KB/sec.	8mm	2245	2305
20-50 GB	10i Auto Tape Loader	1 MB/sec.	8mm	CALL	CALL

All tape backup drives include 1 piece of media and Retrospect backup software

Memory

VRAM 256K/512K	Centris,LCIII,Quadra
2x8x80	4MB 60/70ns
4x8x80 60/70ns	8MB 60/70ns
4x8x80 FX	16MB 70ns
16x8x80 Low Profile	32MB 60ns
16x8x80 FX	

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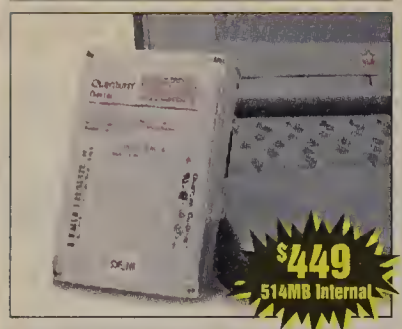
DAYTONA Series



Quantum

30 DAY

The Quantum Daytona Series are high capacity 2.5-inch hard disk drives that provide unmatched mass storage solutions for the Apple PowerBook. The drives have advanced performance features like StackWrite firmware and a unique latching mechanism, called ShockLock, that provides maximum protection against non-operating shock.

Capacity	Access	Internal	External
DAYTONA *2.5" Portable Drives*			
256MB	17ms	$279	$399
514MB	17ms	$449	$569
LPS SERIES *Value/Entry Level*			
3.5" Low Profile			
270MB	14ms	$185	$245
LIGHTNING SERIES *Value/Performance*			
3.5" Low Profile			
365MB	11ms	$209	$269
540MB	11ms	$255	$315
730MB	11ms	$339	$399
EMPIRE SERIES *Performance/Capacity*			
3.5" Low Profile			
1080MB	9.5ms	$599	$659
3.5" Half Height			
2100MB	9.5ms	$1039	$1099
GRAND PRIX SERIES *Performance/Capacity*			
3.5" Half Height			
4280MB	8.6ms	$2239	$2299

ClubMac NEW PRODUCT

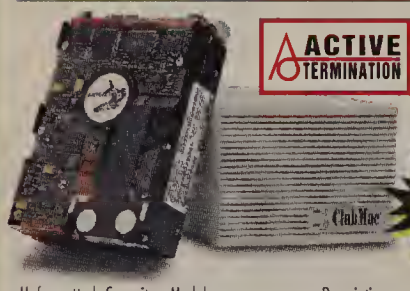
Quantum LPS, Lightning, Empire, and Grand Prix Series carry a 30-Day Money Back Guarantee and a TWO Year Warranty. Quantum Daytona Series carry a ONE Year Warranty.

LIGHTNING Series

The Quantum Lightning 3.5-inch hard disk drives, are high-performance, high-capacity devices built on a solid foundation of proven technology. These drives are designed for business, technical, and multimedia application.

EMPIRE Series

Seagate



FIVE Year Warranty

30 DAY

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" Half Height & Low Profile						
2.4GB	ST12400N	Hawk 2	9ms	2000MB	$1099	$1159
4.3GB	ST15230N	Hawk 4	9ms	4000MB	$2019	$2079
2.5GB	ST12550N	Barracuda 2 LP	8ms	2050MB	$1199	$1259
4.3GB	ST115150N	Barracuda 4	8.5ms	4000MB	$2469	$2529
5.25" Full Height						
3.4GB	ST43400N	Elite-3	11ms	2750MB	$2079	$2179
9.1GB	ST410800N	Elite-9	11ms	8600MB	$3769	$3869

Seagate drives include a 30-Day Money Back Guarantee and a FIVE Year Warranty.

FEATURING

SyQuest® REMOVABLE TECHNOLOGY

Media	Qty 1	Qty 10	Qty 20
44MB	$57ea	$56ea	$55ea
88MB	$67ea	$65ea	$63ea
200MB	$79ea	$78ea	$77ea
105MB	$55ea	$53ea	$51ea
270MB	$65ea	$63ea	$61ea

All SyQuest drives include a 30-Day Money Back Guarantee, TWO Year Warranty, and ONE formatted cartridge. SyQuest cartridges include a FIVE Year Warranty.

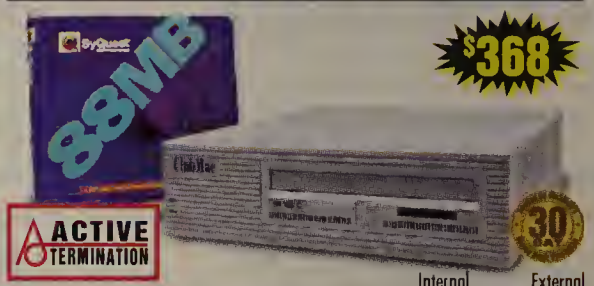
ClubMac 270MB Removable

	Internal	External
3.5" ClubMac 270MB	$449	$489

ClubMac 200MB Removable

	Internal	External
5.25" ClubMac 200MB	$448	$488

ClubMac 88MB Removable



	Internal	External
5.25" ClubMac 88MB	$328	$368

ClubMac OPTICAL Drives

ClubMac 1.3GB MO

- 39ms average seek time
- 5.0MB/sec sync. data transfer rate
- 3,000 RPM rotational speed
- 80,000 hours MTBF

30 DAY

Best Low-Cost Solution

...bargain hunters will appreciate the excellent tech support and quality of this drive."
-- December 1994, Macworld

ACTIVE TERMINATION

Optical Drive	Size/Model	Seek Time	Internal	External
ClubMac 230MB	3.5" Olympus	28ms	$865	$895
ClubMac 1.3GB	5.25" Sharp	39ms	$1869	$1899
MaxOptix Tahiti III 1.3GB	5.25" 1.3GB	19ms		$2499

ClubMac Opticals include ONE cartridge, 30-Day Money Back Guarantee and a ONE Year Warranty (Olympus Optical includes a TWO Year Warranty.)

OPTICAL MEDIA						
	3.5" 128MB	$29	5.25" 594MB	$79	5.25" 1.2GB	$99
	3.5" 230MB	$39	5.25" 652MB	$79	5.25" 1.3GB	$99

CD-ROMs

ClubMac 2X CD-ROM

- Dual Speed CD-ROM Reader
- 300KB/sec data transfer rate
- 320ms average access time
- 64K data buffer
- Caddy-less design
- LED lights, headphone jack and RCA jacks
- Kodak PhotaCD (Multisession) compliant
- Includes Anubis driver software
- 50,000 hours MTBF and ONE Year Warranty

PhotoCD 30 DAY

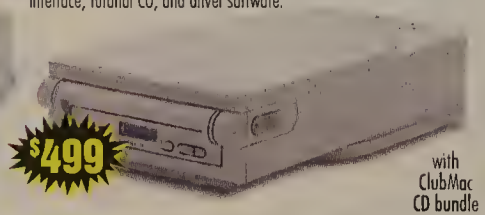
NEC

GREAT BUY

NEC MultiSpin 4Xe CD-ROM

Designed for high-performance CD-ROM applications, multimedia development and networks, the NEC MultiSpin 4Xe features a data transfer rate **FOUR TIMES** faster than single speed CD-ROM readers (600KB/sec) and a 220ms access time. You can get information faster, see smoother animation and video, and keep network traffic flowing freely. The NEC MultiSpin 4Xe includes a Mac interface, tutorial CD, and driver software.

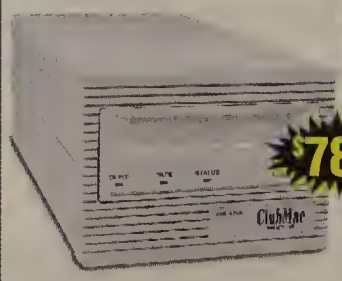
QuickTime · MultiSpin CD-ROM READER · PC Multimedia PC · PhotoCD



		with ClubMac CD bundle
ClubMac Dual-Speed 320ms access time, 300KB/sec transfer rate	$199	$299
ClubMac Quad-Speed 220ms access time, 600KB/sec transfer rate	$385	$485
NEC MultiSpin 2V (available in gray) 320ms access time, 300KB/sec transfer rate	$249	$349
NEC MultiSpin 3Xp Plus 240ms access time, 500KB/sec transfer rate	$399	$499
NEC MultiSpin 4Xe 220ms access time, 600KB/sec transfer rate	$499	$599

NEC MultiSpin CD-ROM Readers carry a TWO Year Warranty.
ClubMac CD-ROM Readers carry a 30-Day Money Back Guarantee and a ONE Year Warranty

ClubMac TAPE BACKUP Drives



ClubMac 2.0GB DDS DAT Drive

- 20 sec ave data access time (based on 60m tape)
- Up to 266 KB/sec data transfer rate
- SCSI-1/SCSI-2 interface
- 60,000 hours MTBF
- Includes Switchable Active Termination, TWO Year Warranty, Retrospect BackUp Software, and ONE 90m tape cassette

ACTIVE TERMINATION 30 DAY

Capacity	Model	Format	Media	Internal	External
2.0GB	ClubMac DAT	DDS	60m, 90m	$739	$789
4.0GB	ClubMac DAT/2	DDS-2	60m, 90m, 120m	$869	$919
4-8GB	ClubMac DAT/2DC	DDS-2DC	60m, 90m, 120m	$949	$999

TAPE BACKUP MEDIA	4mm 60m $10	4mm 90m $12	4mm 120m $25

ClubMac DAT and DAT/DC drives include Retrospect v2.1 Backup Software, ONE 90 Meter Tape and a TWO Year Warranty. Exabyte Tape Backup drives carry a ONE Year Warranty. The ClubMac DAT/2 drive includes Retrospect v2.1 Backup Software, ONE 120 Meter Tape and a ONE Year Warranty

ClubMac CD Bundle

$800 VALUE

Monitors, Graphic Cards & Multimedia

IntelliColor Display/20e

The Radius IntelliColor Display/20e delivers unrivaled command of your desktop, from on-the-fly resolution switching to state-of-the-art color temperature control. Combined with Radius' IntelliColor software, it allows you to emulate 3 lightning conditions and user-adjustable color temperature, so you get more accurate color representation.

$1899

Monitors

PressView 21T Display System (PV2102)	$3199
SuperMatch 21•T XL Trinitron (ST02102)	$2095
IntelliColor Display/20e (0461)	$1899
PrecisianColar Display/17 (0460)	$989
SuperMatch 17•T PRO (STD1702)	$819

VideoVision Studio 2.0

$3535

With JPEG hardware compression and decompression for full-screen, full-motion recording and playback from a hard disk, VideoVision Studio combines the power and flexibility of the Macintosh with the ease and transportability of video tape.

PowerMac 8100 Compatible !!

Multimedia

VideoVision Studio 2.0 (041B)	$3535
VideoVision Studio 2.0 Upgrade (0419)	$1699
Spigot Power AV (OV1630)	$759

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Thunder IV GX•1600

Super-fast, super-resolution graphics cards for Photoshop users with high-performance Macs. 1600 x 1200 resolution. World's fastest accelerated 24-bit QuickDraw. 7-inch NuBus design. 10-bit DAC technology. Dynamic Desktop software. ColorComposer software.

NEW

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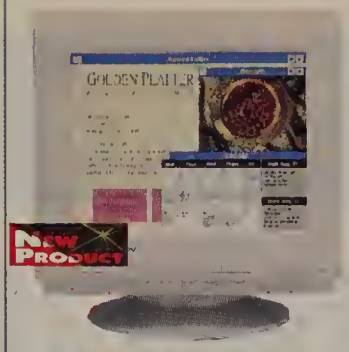
Thunder IV GX•1360 (0446)	$Call
Thunder IV GX•1152 (0485)	$Call
Thunder/24 GT (0491)	$Call
PhotoEngine upgrade to Thunder/24 GT (04B2)	$Call
PrecisianCalar Pra 24X (0429)	$Call
PrecisianColor Pra 24XK (0430)	$749
PrecisianCalar Pra 24XP (0431)	$279

NEC



NEW PRODUCT

15" MultiSync XV15

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- Perfect entry level business, small office/home office, home education/entertainment
- 15" diagonal flat square technology
- FullScan capability for edge-to-edge images
- Mac and PC compatible
- Fine 0.28mm dot pitch
- 640 x 480 up to 1024 x 768 resolution

14" MultiSync 2V	$335
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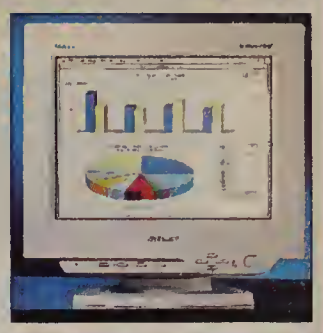
15" MultiSync XE15/XP15	$569/695
17" MultiSync XE17/XP17	$1019/1299
21" MultiSync XE21/XP21	$2079/2579

SONY



15" MultiScan Trinitron 15sf

$445

- Designed for entry level business, small office/home office, and home education/entertainment.
- Super Fine Pitch MultiScan Trinitron
- 0.25mm Aperture Grille Pitch
- Resolution up to 1280 x 1024 at 60Hz
- Color temperature controls
- Energy Star and MPR II complaint
- THREE Year Warranty

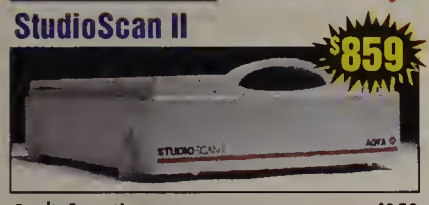
15" MultiScan Trinitron 15sf	$445
17" MultiScan Trinitron 1730	$959
17" MultiScan Trinitron 17-SE1	$999
20" MultiScan Trinitron 20se	$1949

Scanners

AGFA

StudioScan II

$859



StudioScan II	$859
StudioScan	$679
StudioScan II Transparency Unit	$379
StudioScan Transparency Unit	$379

AGFA scanners carry a ONE Year Warranty.

MICROTEK

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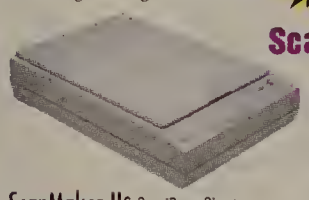
ScanMaker IIHR



ScanMaker IIG OmniPage Direct	$399
ScanMaker IISP Photoshop LE, OmniPage Direct	$769
ScanMaker IIHR Photoshop, OmniPage Direct	$1079
SanMaker III Photoshop	$2529

Microtek scanners carry a ONE Year Warranty.

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HP ScanJet IIcx Scanner

1600-dpi enhanced resolution (400 dpi optical) with one pass, 24-bit color scanning (up to 16.7 million colors) and it includes the HP AccuPage 2.0 software.

SAVE $150

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HP ScanJet 3p Scanner	$479
HP ScanJet IIcx Trans. Media Adapter	$629
HP ScanJet IIcx Auto Document Feeder	$465
HP ScanJet 3p Auto Document Feeder	$199

* After MFR $150.00 mail-in rebate, offer ends 2/28/95

HP scanners carry a ONE Year Warranty.

EPSON

Epson ES-1200C Pro Mac Scanning System

$1269

ES-1200C Pro-MAC (Up to 4800dpi, Full version of PhotoShop, ScanTastic, Kai's PowerTools)	$1269
ES-800C LE (Up to 1600 dpi, PhotoShop LE, ScanTastic)	$899
ActionScanning-Mac (Up to 1200 dpi, PhotoShop LE, ScanTastic)	$549

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NEC

NEC Silentwriter Model 640

$699

- 6ppm Print Speed
- 300 dpi print resolution
- Adobe PostScript Level 2 interpreter
- 35 True Type fonts
- 3MB RAM standard
- AppleTalk Interface
- Limited TWO-Year Overnight Replacement Warranty

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- Perfect companion for the PowerBook
- 600 x 300 dpi with HP's exclusive REt technology for crisp, black output
- Up to 3ppm (draft mode) • Up to 16.7 million colors with the optional Color Kit

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HP DeskWriter 320 Printer 600 x 300 dpi, up to 3ppm	$299
HP DeskWriter 320 Printer with Cutsheet Feeder (60-sheet)	$369
HP DeskWriter 540 Inkjet Printer 600 x 300 dpi, up to 3ppm, 35 fonts	$289
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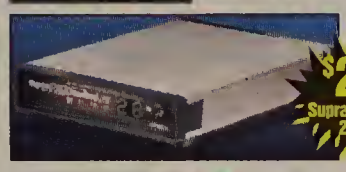
HP DeskJet 1200C/PS Color Printer 600 x 300 dpi, 6ppm	$1999
HP LaserJet 4ML Printer 300 x 300 dpi, 4ppm, 35 scalable fonts	$1028
HP LaserJet 4MP Printer 600 x 600 dpi, 4ppm, 35 scalable fonts	$1368

HP LaserJet Printers carry a ONE Year Warranty. HP DeskWriter Inkjet Printers carry a THREE Year Warranty. HP DeskWriter 320 Printers carry a ONE Year Warranty.

Modems

SupraFAXModem



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SupraFAXModem 14.4 MC V.32bis, V 42bis w/FAXcilitate & Micro	$199
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SupraFAXModem 28.8 MC V.Fast Class	$279
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TelePort Gold II External 14.4 fax modem	$139
Bronze/Bronze II 2400, 4800, 9600 Fax	$89
PowerPort Mercury for PB 100/500/Duo Series	$325
OneWorld Fax 2-Line Ethernet	$1259

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DAYSTAR DIGITAL

PowerPro Accelerators

66 MHz Turbo 601-Mac IIci (001213)	$1179
66 MHz Power Card 601 (00120)	$1669
66 MHz PowerPro 601	$1339
80 MHz PowerPro 601	$1899
FastCache PowerPro - 1MB Cache	$499

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40 MHz Turbo 040 with 128K cache	$889
PowerCache Adapter*	$99
Mac IIcx Adapter	$129

* Not req'd for IIci, IIvi, IIvx Performa 600

$1179 66 MHz Turbo 601

FREE SOFTWARE RayDream Designer 3.0 with any PowerPro purchase $250.00 value (while supplies last)

Networking

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10THUB/12	10BT Hub w/12 10T, Thk & Thn ports	$369	
10THUB/8	10BT Hub w/8 10T, Thn port	$189	
Micro EN/SC	Thn/10BT SCSI Ether w/DT& PB cable	$265	MGNB-TN Mac II & Perf 600, NuBus, Thk/Thn $112
Micro EN/SC10T	10T SCSI Ethernet w/DT & PB cable	$215	MGNB-10T Mac II & Perf 600, NuBus, Thk/10BT $109
AP10T	Micro AsantéPrint, 10BT	$285	MGILC-TN Mac LC/Q6xx/Clr Classic, Thn, FPU $109
AP3	Micro AsantéPrint, Thk/Thn/10BT	$309	MGILC-10T Mac LC/Q6xx/Clr Classic, 10BT, FPU $89
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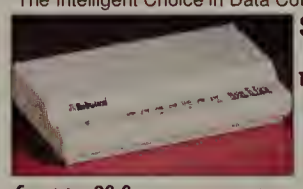

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TRUE V.34 with V.FC

$249

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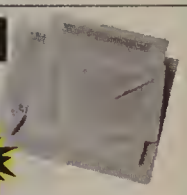
Sportster 28.8 Mac&Fax V. Fast Class	$219
Spartster 14.4 Mac&Fax V. 32 bis	$119

Input Devices

WACOM

ArtPad 4x5

$159



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ARTZ 6x8 ADB Tablet with Painter Bundle	$479
UD 12x12 Standard Tablet	$499
UD 12x18 Standard Tablet	$699
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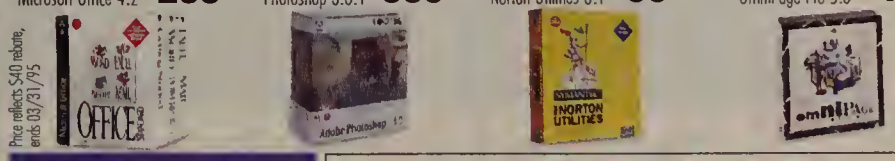
Upgrade to Microsoft Office 4.2	$235.95
Adobe Photoshop 3.0.1	$559.95
Symantec Norton Utilities 3.1	$99.95
Caere OmniPage Pro 5.0	$469



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UC 1260	12[illegible] 9600 dpi, 2[illegible]	$869
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[illegible] Photoshop, Kai's Power T[illegible]	
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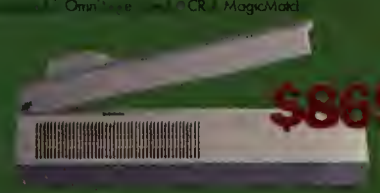

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1 GB Hammer RAID NuBus Upgrade	$1629
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Sustained transfer rate of 11.6 MB/sec. Includes JackHammer SCSI-2 Nu[illegible] RAID Tool[illegible] software cables active [illegible]	
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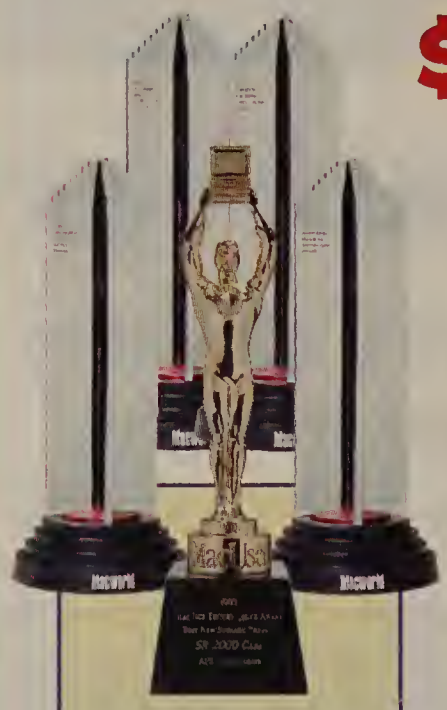

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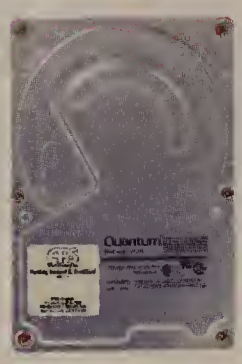
Exclusive Digitel Active Terminetion™	✓	✓
Provides Perfect Terminetion Power	✓	✓
Oresticelly Reduces SCSI Retries	✓	✓
Reguletes SCSI Line Voltege	✓	✓
Solves Ceble Impedence Issues	✓	✓
LEO Activity Indicetors Oiegnostic Tool	✓	✓
Eesy Installetion: Tekes Seconds	✓	✓
Term. Power for Entire SCSI Bus		✓
Self-Heeling Fuse to Hendle Power Overloeds		✓

APS Q 540

$249.95* Internal configuration



APS Q 540

"Quality design and construction at a great price makes the APS Q 540 a great buy. Digital Active Termination™ ensures top-notch performance."

Mac User LABS ★★★★ — *MacUser August 1994*

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"... and this device may well be the cure for your SCSI Woes. Even if your SCSI setup is working OK, I heartily recommend SCSI Sentry as an extra ounce of protection."

— *Macworld SEPT 94*

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APS Q 540[2] Quantum 540	516MB	249.95	349.95
APS Q 730[2] Quantum 730	731MB	329.95	429.95
APS MS 4110[5] Micropolis 4110 mechanism	1002MB	599.95	699.95
APS ST 1.0[5] Seagate ST 31230N Barracuda	1010MB	599.95	699.95
APS D 1.0[5] DSP 3107 mechanism	1020MB	699.95	799.95
APS Q 1080[2] Quantum 1080S mechanism	1029MB	599.95	699.95
APS Q 2.0[5] Quantum 2160 mechanism	2006MB	1099.95	1199.95
APS MS 2.0[5] Micropolis 4221 mechanism	2104MB	1199.95	1299.95

DATerm™ patent pending
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Model	Capacity	Internal	SR2000
2040MB - 8673MB			
APS ST 2.0[5] Seagate 2.0 Barracuda	2040MB	$1299.95	$1399.95
APS D 2.0[5] DSP 3210 mechanism	2047MB	1199.95	$1299.95
APS MS 4.0[5] Micropolis 3243 mechanism	4075MB	2299.95	2399.95
APS MS 4.0AV[5] Micropolis 3243AV mechanism s	4075MB	2399.95	2499.95
Mac User LABS ★★★★ APS ST 4.0[5] Seagate ST 15150 mechanism	4294MB	2399.95	2499.95
APS MS 9.0[5] Micropolis 1991 mechanism	8500MB	3399.95*	3599.95
APS MS 9.0AV[5] Micropolis 1991AV mechanism	8500MB	3499.95*	3699.95
Mac User LABS ★★★★ APS ST 9.0[5] Seagate ST410800N mechanism	8673MB	3799.95*	3999.95

1-5 *Denotes length of manufacturer's warranty*
* *External Case is Special Full Height Only*
* *Internal Price Listing*
Full Height cases include SCSI Sentry FREE!
Internal drives for Quadra 800 and Centris 610 available

Model	Capacity	RAID Type	Price
APS ARRAID			
ARRAID S2/5400[5]	2GB	Striped	$1599.95
ARRAID S4/5400[5]	4GB	Striped	2899.95
ARRAID S4/7200[5]	4GB	Striped	2999.95
ARRAID M1/5400[5]	1GB	Mirrored	1599.95

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For less than the cost of alot of companies' 2x drives, you get 4x performance (that's right, quad speed). How fast is that? Try an average access time of 149 ms, and sustained transfer rates as high as 534KB/sec. Remember, you also get the best-engineered enclosure in the industry. Full metal shielding, stackability and APS' Digital Active Termination are a combination you can't find on comparable drives at any price.

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CD ROM

Model	Price
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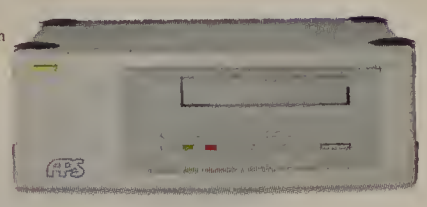
APS DAT External configuration

$799.95



Macworld's 1994 World-Class Award for Alternativa Storaga goes to the APS line of DAT Drives

APS HyperDAT

$999.95

External configuration

APS DAT

The APS DAT's now an incredible deal! For a limited time, buy the APS DAT at just $799 and you'll get the expanded capability provided by an enhanced speed mechanism and hardware data compression! That's right! Just $799 buys you the APS DAT that's now up to 20% faster than other DDS-1 DC drives. Pack up to 4GB of DATA on a 90M tape! - Amazing!

**Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment*

APS HyperDAT

If you need high-speed backup (not the kind that ties your server up and slows down your network), you need the DDS-2 power of the APS HyperDAT! Back up locally at rates as high as 28MB per minute! Pack up to 10GB on a single tape! Best of all, your regular DDS and DDS compression tapes can be read in the APS HyperDAT, too!

APS SQ 5200

"The quick, well constructed APS SQ 5200 tops our list of 200MB SyQuest drives. The drive has a good price as well as bells and whistles such as Digital Active Termination and APS provides excellent tech support."

—MacUser February 1995

SYQUEST

Model	Capacity	SR 2000
APS SQ 5110c[2]	44/88MB†	$399.95
APS SQ 5200[2]	200MB††	499.95
APS SQ 3105[2]	105MB	329.95
APS SQ 3270[2]	270MB	499.95

† Does not format 44MB cartridges
†† Does not format 44MB & 88MB cartridges
All SyQuest Drives Include 1 FREE Cartridge

SyQuest Media	1-4	5-19	20+
SQ-400 (44MB) cartridge	$59.95	$58.95	$57.95
IO-44 (44MB) cartridge**	49.95	48.95	47.95
SQ-800 (88MB) cartridge	79.95	78.95	77.95
IO-88 (88MB) cartridge**	69.95	68.95	67.95
SQ-2000 (200MB) cartridge	89.95	87.95	86.95
SQ-310 (105MB) cartridge	59.95	57.95	56.95
SQ-327 (270MB) cartridge	69.95	68.95	67.95

Prices listed are for unformatted media
*** Indicates SyQuest compatible cartridges*

MAGNETO OPTICAL

Model	Internal	SR 2000
APS 230 MO[1]	$699.95	$799.95
APS 1.3 MO[1]	1899.95	1999.95

All MO Drives Include 1 FREE Cartridge

MO Media *(unformatted)*	1-4	5-19	20+
128MB cartridge —	$35.95	$34.95	$29.95
230MB cartridge —	45.95	44.95	39.95
1.3MB cartridge —	109.95	109.95	104.95 (1024KB/S)

POWERBOOK DRIVES

Model	Capacity	Internal	LW Pro 630	Companion II
APS T 340[1]	324MB	$399.95	$449.95	$549.95
APS Q 341[1]	320MB	349.95	399.95	—
APS Q 514[1]	490MB	449.95	499.95	—
APS T 520[1]	500MB	449.95	499.95	599.95

DAT

Model	Capacity*	Internal	SR 2000
APS DAT[2]	2-5G on 90m	$749.95	$799.95
APS HyperDAT[1]	8-10G on 120m	949.95	999.95

**Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.*

Maxell DAT Tapes	1-4	5-19	20+
60-Meter	$9.95	$8.95	$7.95
90-Meter	11.95	10.95	9.95
120-Meter (DDS-2)	22.95	21.95	20.95

3M DAT Tapes	1-4	5-19	20+
60-Meter	$9.95	$9.50	$8.50
90-Meter	11.95	11.50	10.50

All APS DATs Include Retrospect by Dantz, and 1 Tape Free!

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• All prices and specifications are subject to change without notice.
• Refused orders subject to restocking fee.
• Hard drives include brackets, cables, cords and LEDs required for operation with the specified Macintosh -where applicable. All hard drives from APS Technologies come preformatted with Apple's System 7.0.1 software and APS Technologies' APS POWER TOOLS SCSI formatter/hard disk partitioner.
• All external drive products and cases come with a premium 25 x 50 SCSI cable. Companion II drives, (not cases) include a 25x50 SCSI cable with SCSI BOY.
• International customers must pay for all shipping charges.
• Toll free technical support as needed. Regular hours are 8 am to 6 pm Monday thru Friday, 9 am to 5 pm Saturday, Central Time.

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MacUser RATED 4½ OCTOBER 1994

The Spin 1021: "The fastest drive... a killer."

1GB-1.6GB category

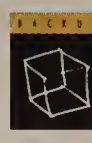
Bernoulli Drives

Based on the new Bernoulli mechanism, Spin's 230MB cartridge drive continues the Bernoulli tradition of rugged dependability while creating a new performance standard for cartridge drives. With a five year warranty on drives and cartridges, the 230MB drive features DCR Active Termination for increased reliability and backward compatibility with older Bernoulli cartridges.

Bernoulli 230MB $399 Cartridge $89

Welcome to Spin Peripherals.

Spin supplies the best drives available so your business moves faster than the world around you. We deliver the speed and dependability you need, and our exceptional customer service team will be there when it seems the world is about to catch up. But don't worry, it won't.



Included with all DAT drives.

DAT Drives

Before disaster strikes, secure you valuable data with a Spin DAT drive. The low cost 3100 stores 2GB while the 3400 packs up to 8GB for remote backups and large audio, video and graphics files. All DAT drives include one tape cartridge and Retrospect™ for easy, complete backups.

Spin 3100 (DDS)	$799
Spin 3200 (DDS-DC)	$979
Spin 3400 (DDS-2)	$999

Optical Drives

Using laser and magnetic technology, Spin MO drives keep your valuable data secure. Spin's 3.5" Olympus 230MB and 5.25" NEC 1.3GB optical drives set the standard for speed and capacity. Great for backups, archiving, and as a secondary drive. One cartridge included.

Olympus 230MB	$899	Cartridge	$39
NEC 1.3GB	$1999	Cartridge	$85
Maxoptix T3 1.3GB	$2739	Cartridge	$85

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Spin's 2x and 4x Multisession CD-ROM drives deliver the excitement of multimedia to your desktop. Enhance either drive with Spin's CD-ROM bundle, including speakers, headphones, CD-ROM titles and more!

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Spin 2x CD-ROM Drive	$199
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SmartTerm

The latest in Macintosh termination technology, SmartTerm's DCR Active Termination ensures data integrity and maximizes SCSI performance. Online status indicators monitor activity and isolate system freezes, while gold connectors provide excellent conductivity. SmartTerm is a smart investment for any Macintosh user.

SmartTerm Active Terminator $65

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Spin 2.5" drives are fast, easy to install, and offer the capacity you need when you are on the road.

Quantum 127MB	$219
Quantum 170MB	$279
Quantum 256MB	$299
Quantum 341MB	$359
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MacUser RATED ★★★★ OCTOBER 1994

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1.7GB-2.8GB category

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Complete multimedia systems as low as $299!

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Multimedia Entertainment! Our 2x CD-ROM drive offers the most affordable solution, while our new 4x races by older drives. Both are Multisession and include DCR Active Termination, stereo RCA jacks, and Red Line! CD software for increased speed. The Bundle contains speakers, headphones, Grolier's Encyclopedia, Oceans Below, and more!

Spin 2x Drive with Bundle	$299
Spin 4x Drive with Bundle	$399

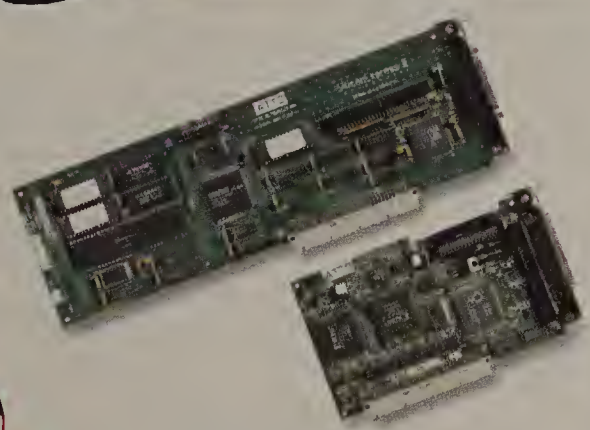
Hard Drives

Our external Tornado drives boast a 40 watt power supply, DCR Active Termination, a front mounted power switch, and interlocking feet for stable stacking. Internal drives take minutes to install. Drives over 1GB include RAIDLine! striping/mirroring software.

CAPACITY	INTERNAL	EXTERNAL
Spin 1021 1.0GB	$699	$799
Spin 2149 2.1GB	$1199	$1299
Quantum 365MB	$209	$309
Quantum 540 MB	$269	$369
Quantum 730MB	$329	$429
Quantum1.08GB	$599	$699
Quantum 1.4GB	$859	$959
Quantum 2.1GB	$1199	$1299
Seagate 2.0GB	$1399	$1499

RAIDLine! Array Software

Free with hard drives over 1GB! RAIDLine! doubles your throughput, writing to 2 drives simultaneously. Striping (RAID Level 0) provides unparalleled speed for all applications, including digital video and Photoshop™. Mirroring (RAID Level 1) is perfect for server applications, creating redundant disks automatically so that your valuable data is always safe.



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Video, prepress and other storage-intensive applications benefit substantially from these SCSI-2 BusMaster accelerators that parallel process with the Mac's CPU. The FAST Silicon Express II accelerates throughput by up to 800%, while the FAST/WIDE Silicon Express IV uses RISC technology to attain a 1400% increase.

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SyQuest 44/88MB	$299	Cartridge	$69
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SyQuest105MB	$279	Cartridge	$56
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FUJITSU — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
530MB**	3.5"	13MS	$ 279	$ 339
1.2GIG	3.5"	8.5MS	$ 575	$ 635

Seagate — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
1.2GIG	3.5"	9MS	ST31200N	$ 645
2.5GIG	3.5"	8MS	Barracuda 2	$ 1295
2.5GIG	3.5"	8MS	Barracuda 2 WIDE	$ 1499
2.4GIG	3.5"	9MS	ST12450W	$ 1749
3.4GIG	5.25"	10MS	Elite 3	$ 1999
4.1GIG	3.5"	8MS	BARRACUDA 4	$ 2335
9.0GIG	5.25"	11MS	Elite 9	$ 3995

CONNER — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
330MB**	3.5"	12MS	CFA340S	$ 275
545MB**	3.5"	12MS	CFA540S	$ 450
1.0GIG	3.5"	9MS	CFP1060S	$ 635
2.1GIG	3.5"	9MS	CFP2105S	$ 995
4.2GIG	3.5"	9MS	CFP4207S	$ 2195

Quantum — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	MODEL	EXTERNAL
1.0GIG	3.5"	9MS	E1080S	$ 645
2.2GIG	3.5"	9.5MS	E2160S	$ 1099
4.3GIG	3.5"	9MS	4280S	$ 2295

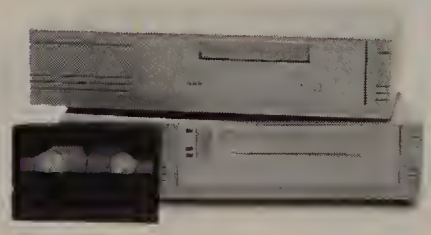
OPTICAL DRIVES

230MB EXTERNAL $799

INCLUDES ONE CARTRIDGE

1 YEAR WARRANTY

CAPACITY	MODEL		ACCESS		EXTERNAL
128MB	Ricoh		30MS		$ 599
230MB	IBM		30MS		$ 849
230MB	Fujitsu		30MS		$ 799
230MB	Olympus	2YR. WARRANTY	28MS	4200 RPM	$ 895
650MB	Sony		40MS		$ 999
1.3GB	NEC		32MS		$ 1935
1.3GB	Sony		40MS		$ 1999
1.3GB	Ricoh Turbo		19MS		$ 2175



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250MB	Tandberg TDC 3660	DC6250	$ 445	$ 499
1.3-2GIG	DC DAT	4MM	$ 709	$ 769
1.3-4GIG	DC DOUBLE DAT	4MM	$ 839	$ 899
4.0-8GIG	Connor 4326 DDS-2	4MM	$ 1089	$ 1149
4.0GIG	Sony 5200 DDS-2	4MM	$ 989	$ 1049
4.0-8GIG	Sony 5000 DDS-2	4MM	$ 1089	$ 1189
1.3-5GIG	Exabyte 8205	8MM	$ 1539	$ 1599
1.3-10GIG	Exabyte 8505	8MM	$ 2179	$ 2259
7.0-14GIG	Exabyte 8505XL	8MM	$ 2255	$ 2355

POWERBOOKS

240MB	14MS	$315	$415
340MB	14MS	$385	$485
514MB	14MS	$445	$545

CD ROMS

TEAC CD-50	$ 275
Toshiba 4101	$ 285
Toshiba 3501 4 Speed	$ 445

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A Mobile storage Product Runs on 2 AA Batteries for 4 months. 10mb/min. 2.37" x 4" x 1.87" Shipping DOS version.

Yamaha 4 speed recorder	$ 4995
Ricoh 1000 CD-Recorder	$ 2195

1.2MB Buffer so you won't get data transfer interruptions (Thats double the buffer size of the Pinnacle Micro). And 680MB media for only $15.99. Just set the recording format, select the files, and hit create.

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MEDIA

128MB	Optical	$ 25	60M Tape	$ 10
230MB	Optical	$ 35	90M Tape	$ 12
650GIG	Optical	$ 79	112M Tape	$ 18
1.3GIG	Optical	$105	120M Tape	$ 22

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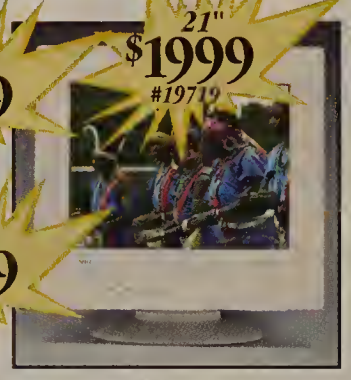

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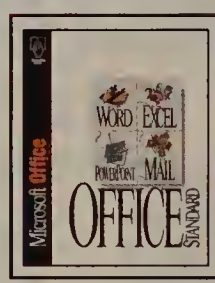

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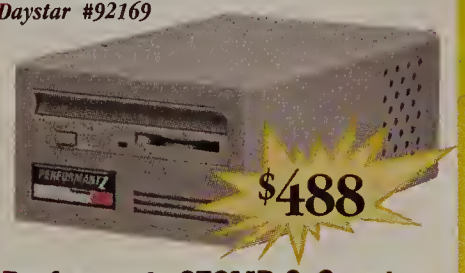

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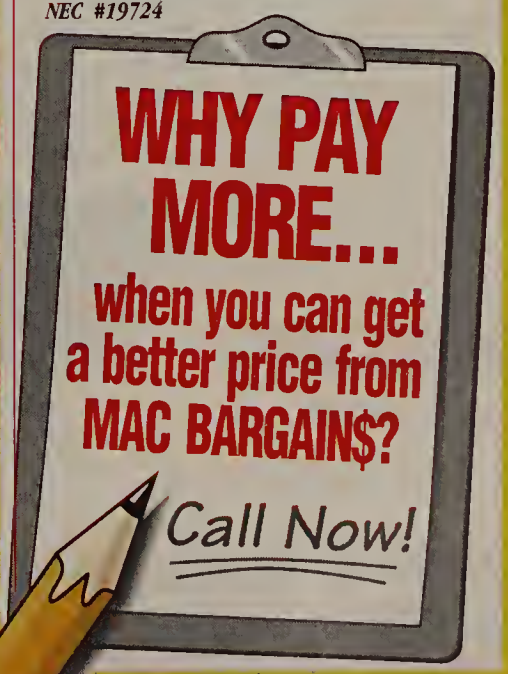

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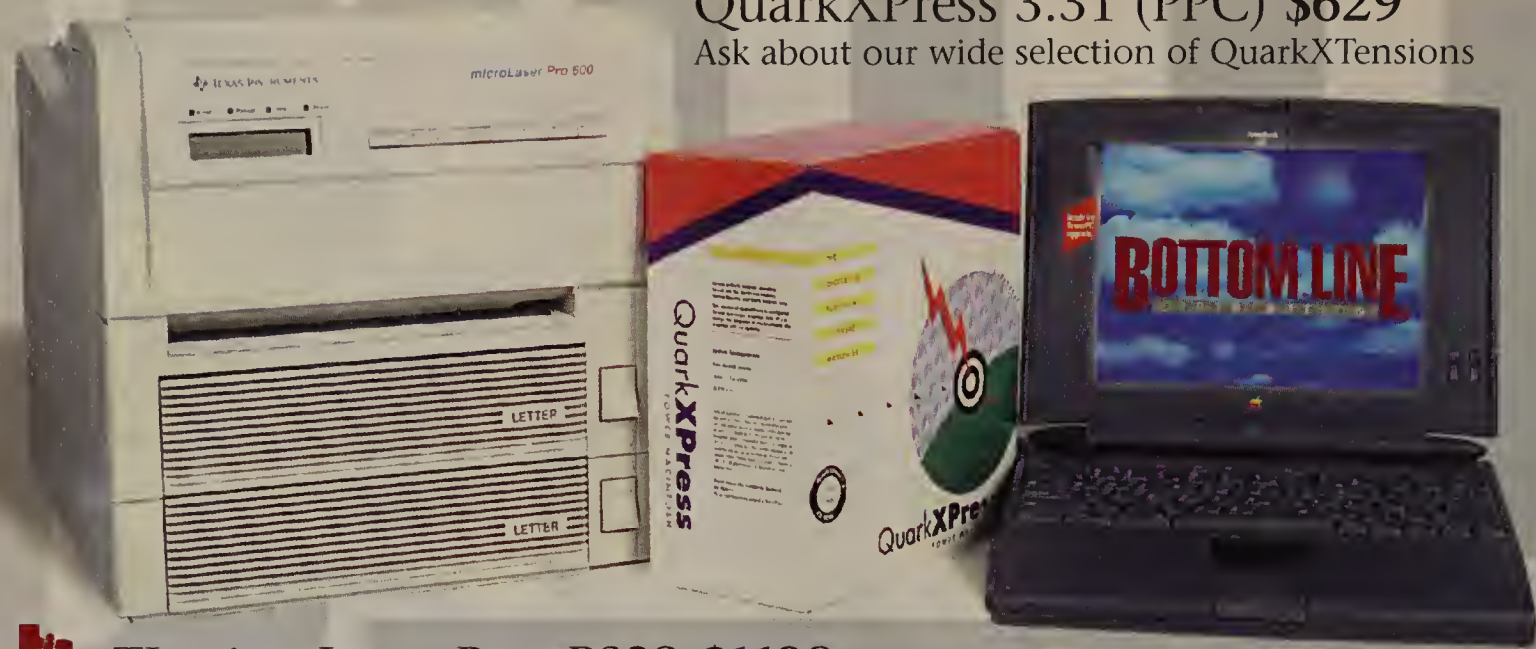

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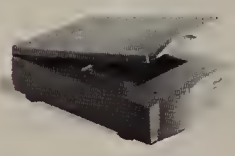

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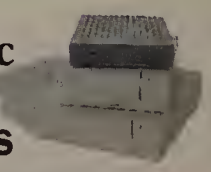

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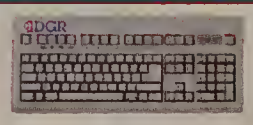

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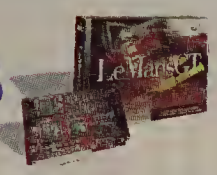

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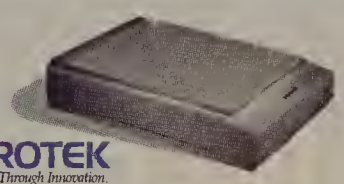

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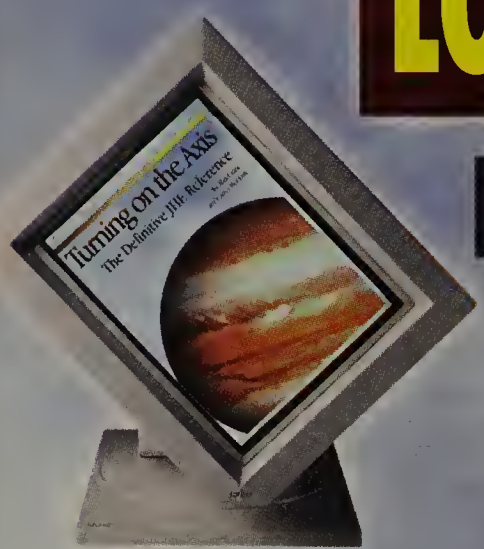

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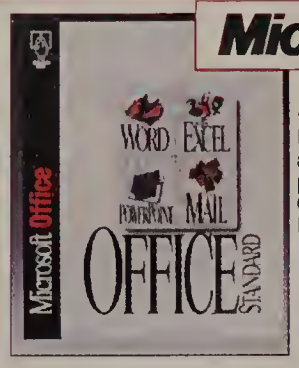

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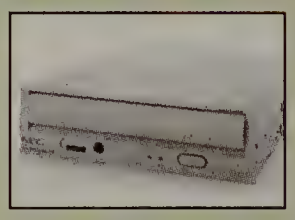

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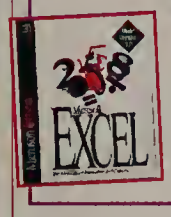

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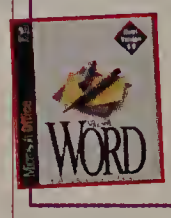

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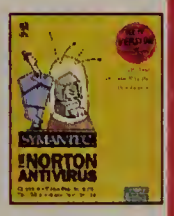

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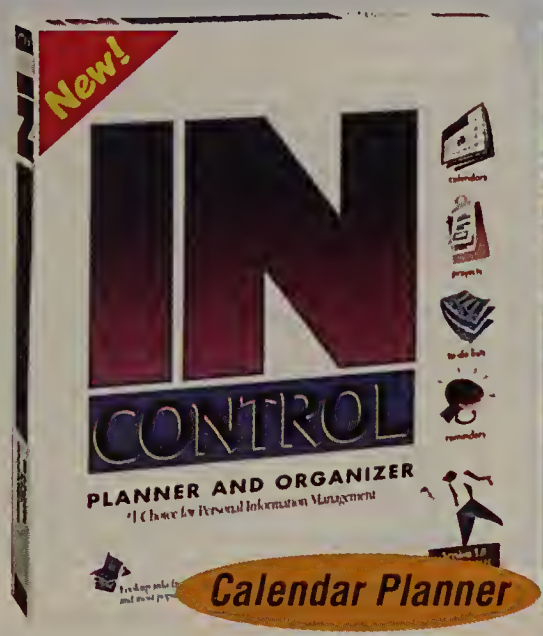

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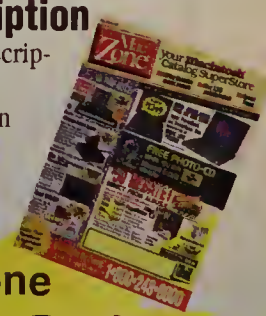

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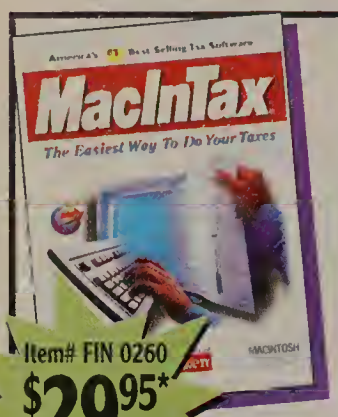

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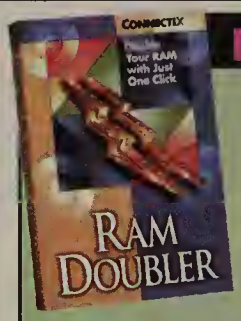

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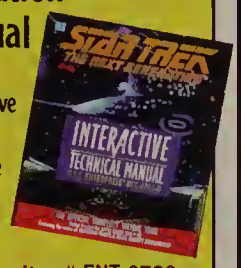

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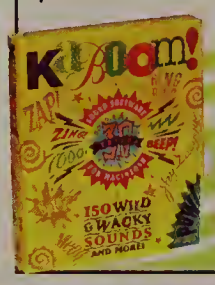

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CD ROM DRIVES

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PRODUCT INDEX
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PRODUCT INDEX

Category	Page No.
ACCESSORIES	238
Covers	
Diskettes	
BUSINESS TOOLS	218-220
Bar Code	
Cataloging Software	
Credit Authorization	
LCD Panels	
Medical	
Point of Sale	
Real Estate	
EDUCATIONAL & RECREATIONAL	238-240
Astrology	
Degree Program	
Discount Software	
Genealogy	
Grading	
Languages	
Music	
Religion	
GRAPHICS	241-242
CAD/CAM	
CD ROM Photos	
Clip Art	
Fonts	
Graphics Translators	
Magazine	
MOBILE COMPUTING & PDA'S	237
Solar Battery Chargers	
MULTIMEDIA & CD-ROM	240-241
CD ROM	
Presentation	
NETWORKING & COMMUNICATIONS	238
BBS	
ISDN	
PROGRAMMING & UTILITIES	251
Languages	
SERVICES & SUPPLIES	243-245
Computer Insurance	
Computer Repair	
Data Recovery	
Patent Research	
Prepress Services	
Slides	
SPECIALIZED MARKETS	242
Math	
SYSTEMS & PERIPHERALS	220-231
Hard Drives	
Switch Box	
Printers	
UPGRADES & MEMORY	231-237

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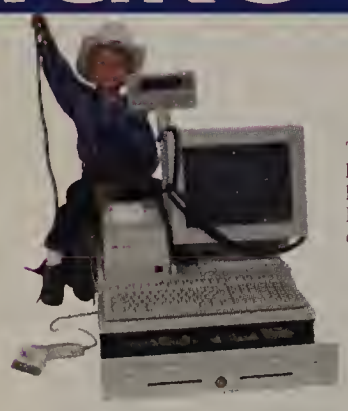

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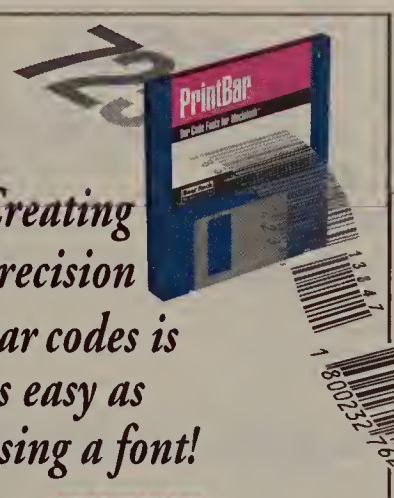

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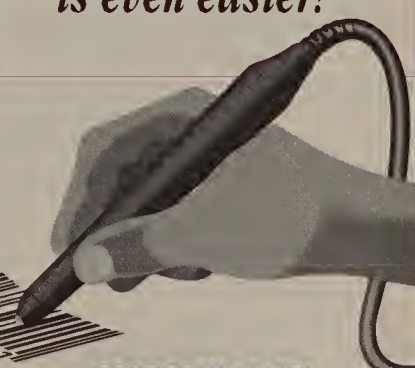

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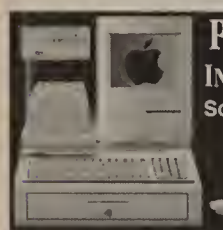

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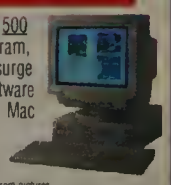

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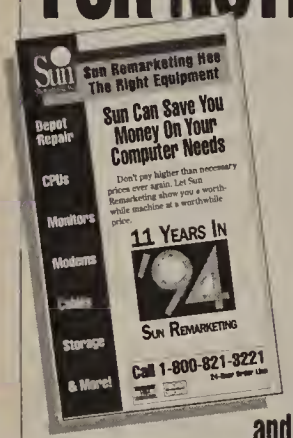

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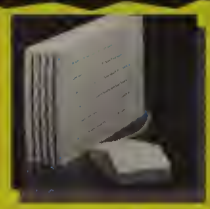

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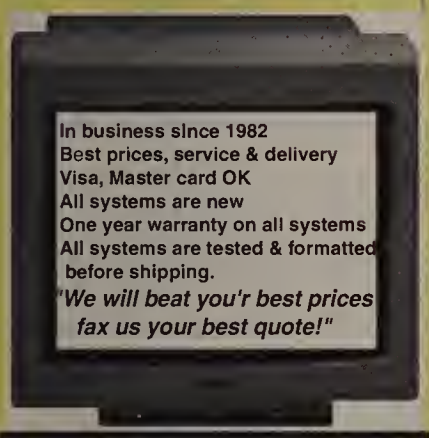

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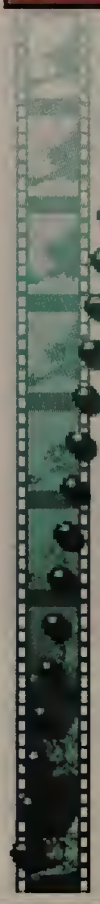

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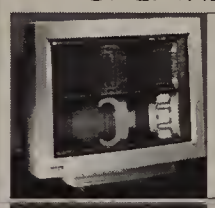

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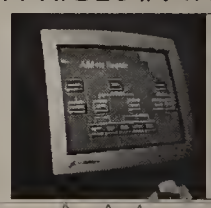

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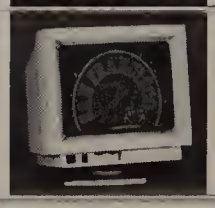

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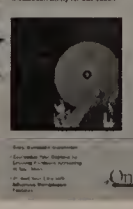

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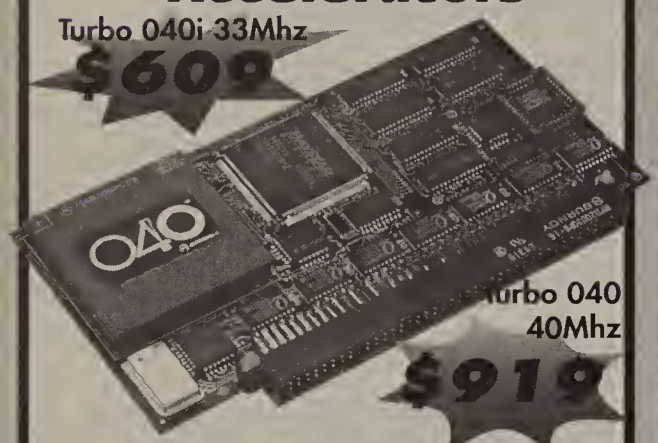

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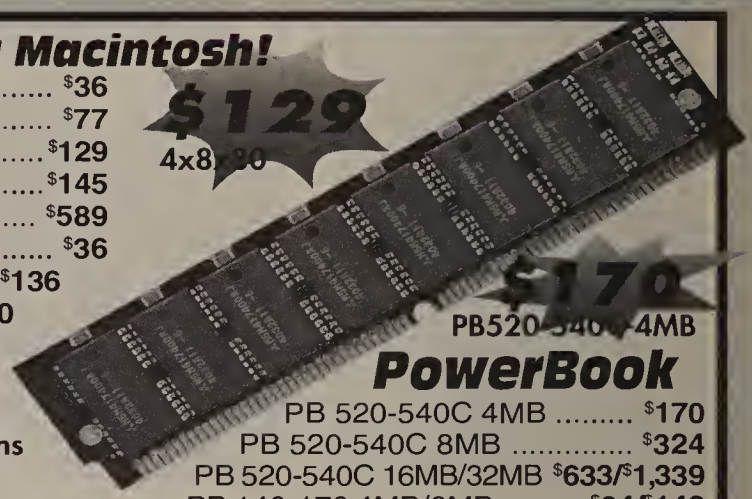

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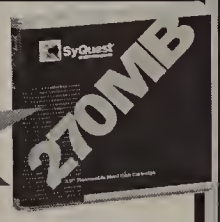

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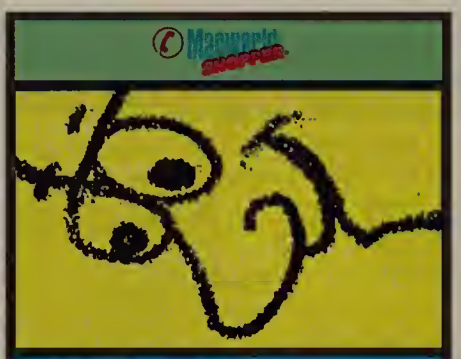

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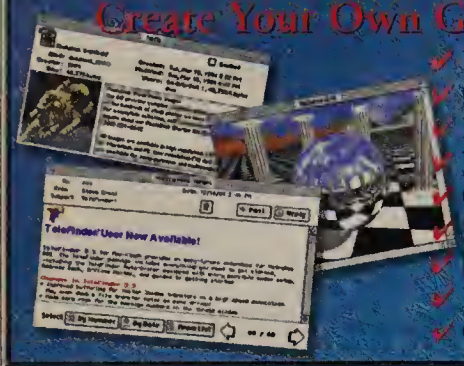

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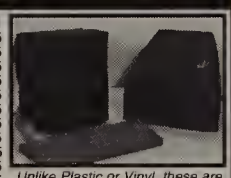

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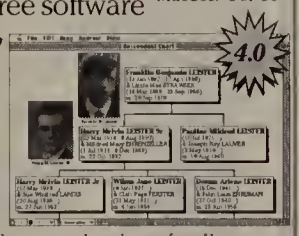

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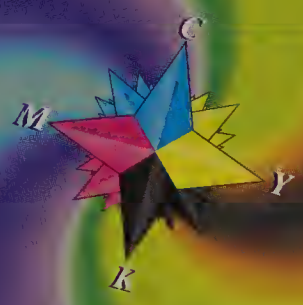

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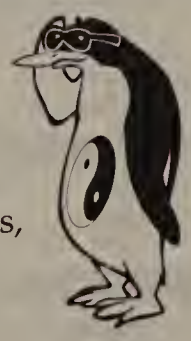

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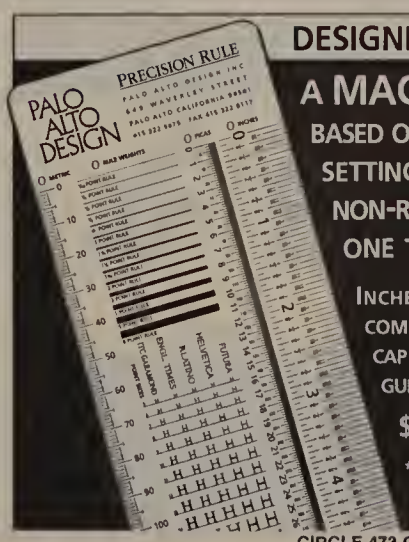

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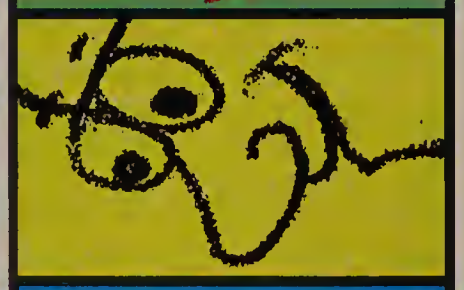

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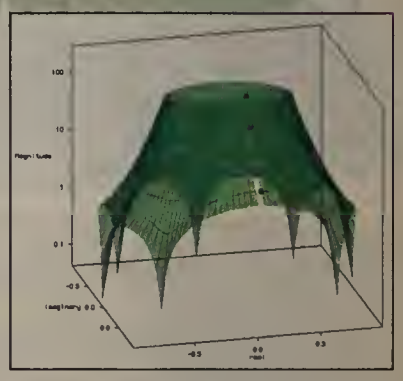

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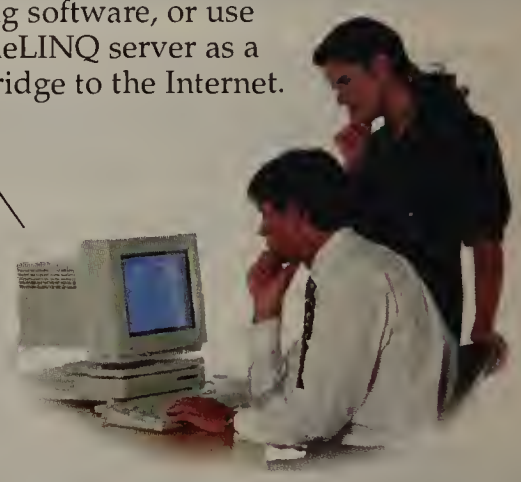

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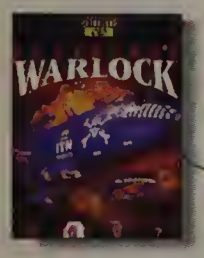

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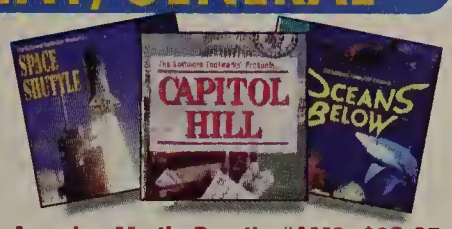

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WISE GUY

BY GUY KAWASAKI

Care and Feeding

Keeping developers happy

ACCORDING TO THE PRESS, financial analysts, and other ignoramuses, software developers will create Macintosh products only if more Mac-compatible computers are sold. So, they reason, Apple has to license the Mac Operating System to get more Mac boxes out the door. The logic is deceptively simple: if the software runs on more computers, developers can make more money, so they write software for the computer that's selling best.

Unfortunately, because Apple is managed based on the expectations of the press and other purported pundits, it seems to have fallen for this logic. Thus, Apple has embarked on the slippery slope of a simple solution: let's get our developers (back) by licensing the Mac OS, thus ensuring the existence of more Macintosh-compatible machines.

Wrong Thing, Wrong Way

Sales volume is definitely a major incentive for developers, but in its single-minded focus on shipping boxes, Apple is ignoring the approaches that worked so well in the past. No developer in his or her right mind has ever believed that the Macintosh sales volume would ever match that of MS-DOS, and then Windows, machines. Sure, Apple employees believed it back in 1984, but we were young, foolish, and paid by Apple.

However, there is still a lot of money to be made in Macintosh software (especially considering the vicious competition in the Windows world), and the decision process of product development isn't black and white. Given reasonable care and feeding, developers will enthusiastically write software for a computer selling in decent volumes—say, 1,000,000 per year. Frankly, companies that require more than 1,000,000 machines sold per year are too fat, dumb, and happy to create software that matters. And if the hardware is cool enough, developers will write software for a computer that might not even reach 100,000 units per year—for example, Next and 3DO systems.

The crux of the matter is, how much does a developer feel wanted by Apple? I'm not talking about speeches by Apple executives saying how important developers are to Apple. Everyone knows the speechwriter just opened a canned speech and used search and replace to change *dealer* to *developer*. (*Dealer* was previously changed from *national account*, and that was changed from *education reseller*, which was changed from *graphic arts community*.) I mean rubber-meets-the-road, down-and-dirty support, like technical information, seeding with prototypes, and a little display of gratitude and enthusiasm.

The Foresight Saga

The following story illustrates how Apple makes developers feel unwanted. A programmer named Jud Spencer was the lead engineer for a contact manager called

FastPace, published by Foresight Technology. Do you recognize the name of the programmer, company, or product? Probably not, and that's OK, because you're not an Apple employee who's paid to keep the Jud Spencers and Foresights of the world happy.

As Jud was finishing FastPace in January of 1994, the folks at Foresight tried their damnedest to get a Power Mac from Apple for testing. They read about Apple's vast seeding program of Power Mac prototypes but couldn't get a Power Mac until four days before the computer shipped. Frustrated by this experience, the president of Foresight wrote a letter to the editor of *MacWeek;* it was immediately published.

Did Apple make any contact with Foresight to apologize, explain, or even refute the letter? Nope. (Another important question: Does anyone at Apple read anything but the *Wall Street Journal*?) What conclusion should Jud, Foresight, and every developer who's had a similar experience draw about how much Apple cares about them? These are programmers and developers who love the Macintosh, hate Microsoft, and would like to make software-development decisions based on love and hate. Ironically, making developers feel wanted is much easier than licensing the Mac OS—it's just not dramatic enough to appeal to the punditaholics at Apple.

The Really Bad News

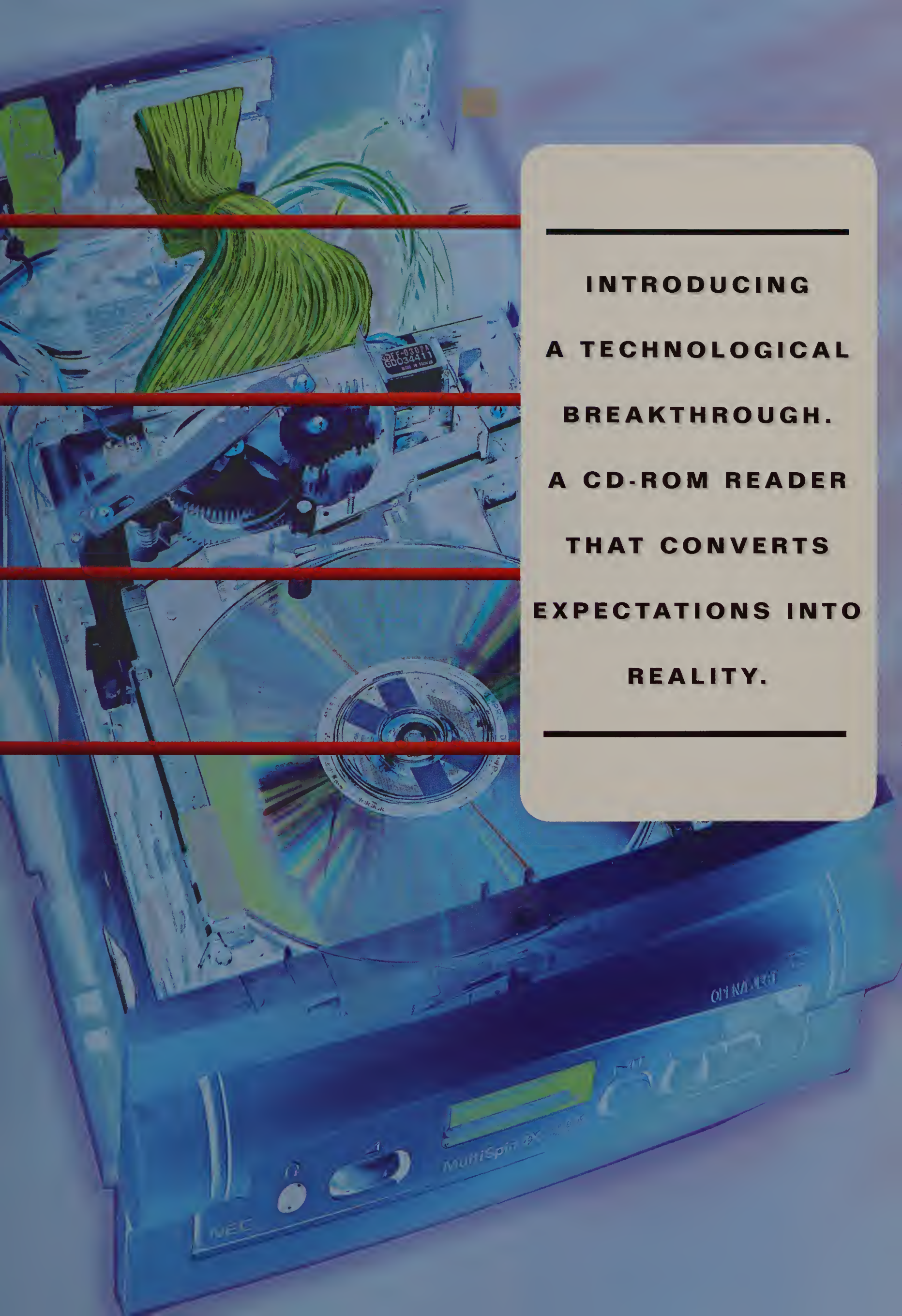
Jud's story gets worse. One day after his letter hit print, two people from Microsoft's developer-relations group contacted Foresight and started a courtship that eventually included a free membership in the Microsoft developer program, plus free copies of Windows NT, Visual C++, Microsoft Office, and various development tools. What conclusion should Jud, Foresight, and every developer who has had a similar experience draw about how much Microsoft cares about them? And Microsoft has an 85 percent market share. Perhaps good developer relations have some connection to market dominance.

Yellow Men Can't Jump

I wish that Apple would read this column and change its ways. I also wish I could slam dunk. Of the two, slam dunking is more likely to happen. Be a pragmatist: write Macintosh software because you love the machine or because it's financially rewarding, not because Apple makes you feel good. After all, feeling good comes from within—not from the vagaries of a large corporation. m

GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. He has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at macway@aol.com.

STEPHEN DURKE



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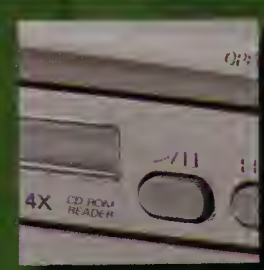

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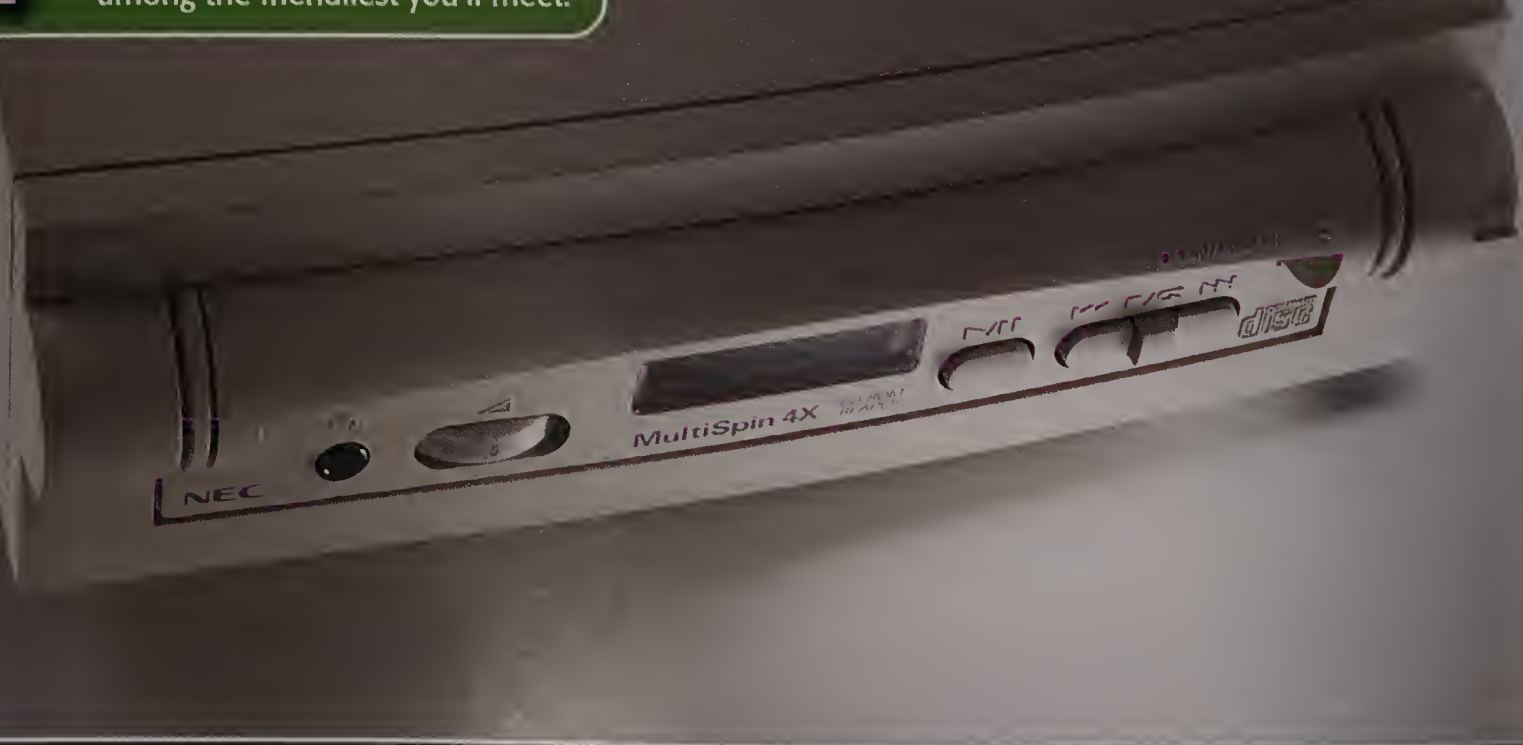

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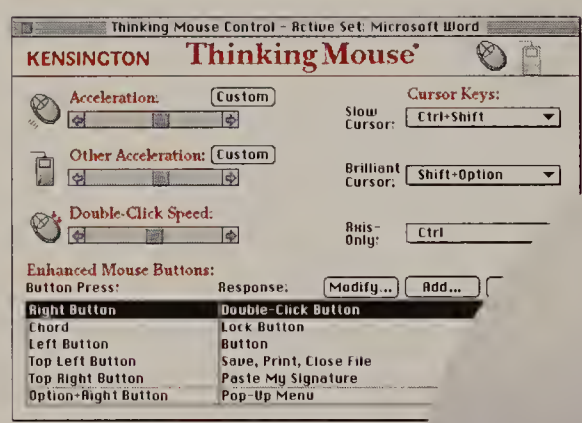

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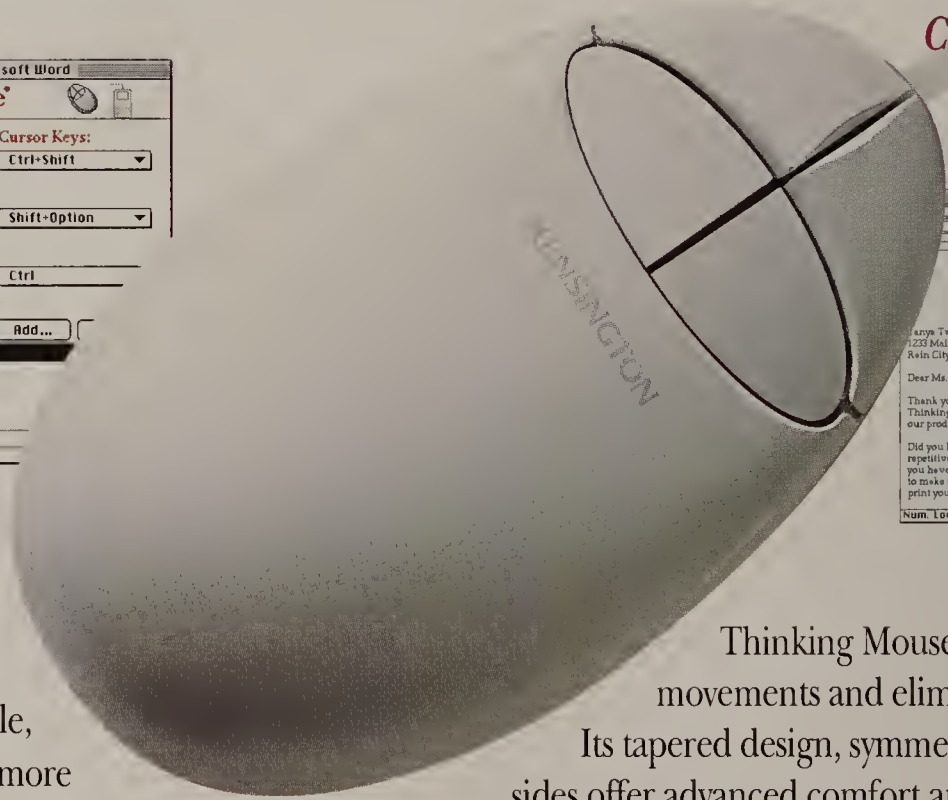

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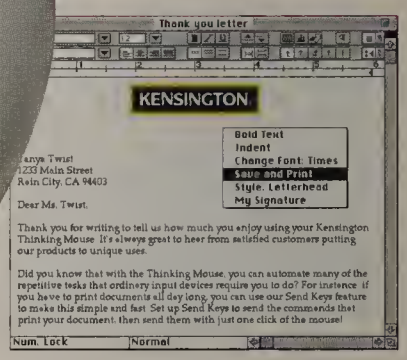

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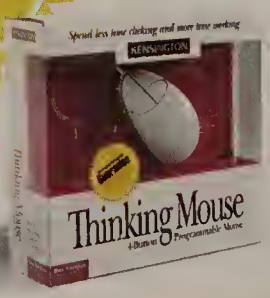

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